

# **SOFTWARE LIBRE PARA LA INGENIERÍA (Y ALGÚN EXTRA)**

- EA mantiene un control de calidad y validación de software a nivel de empresa y proyectos.
  - ▶ El software que aquí se va a exponer normalmente no está validado y **su uso en proyectos NO está permitido.**
  - ▶ **El software libre siempre se entrega sin garantías.**
    - Su uso, modificación y desarrollo van a costa del usuario.
      - Pero hay contratos comerciales ¡Más sobre esto a continuación!
  - ▶ La instalación de software en ordenadores de EAI por el usuario **NO** está permitida.
    - Usad el sistema de Softplan y CAU para la instalación de software. Comprobad las versiones validadas y para cada proyecto.
  - ▶ En caso de duda, consultad los programas de calidad de la empresa y del proyecto.

- ❑ Los logos y marcas son propiedad de cada proyecto y/o compañía.
  
- ❑ **NO** soy un experto en estos programas, la información transmitida puede ser incorrecta.
  - ▶ No me hago responsable de las consecuencias de su uso.
  - ▶ Los programas seleccionados no representan la totalidad.

Esta presentación está bajo la licencia

**CC BY-SA 4.0**

(¡Compartid este conocimiento!)

## ❑ Objetivos del curso

- ▶ **Saber qué es software libre**
- ▶ Ver qué soluciones existen
- ▶ **Que se use más software libre en este mundillo**

## ❑ ¡Preguntad!

## ❑ Índice

- ▶ Introducción al software libre
- ▶ Software mecánico
- ▶ Software eléctrico
- ▶ Software de otros campos
- ▶ Software para el día a día y hobbies

# ¿Qué es el software libre?

- ❑ El software, desde los años 80, se ha ido transformando en una caja negra o jardín vallado
- ❑ [Richard Stallman](#) inicia el proyecto [GNU](#) para crear una solución completamente libre en [1983](#)
  
- ❑ Hoy en día muchísimas soluciones son libres
  - ▶ [Android](#), [VLC](#), [7-Zip](#), [Moodle](#), [Zlib](#), [SQLite](#)...
  - ▶ [Firefox](#), [Chromium](#), [WebKit](#) (Safari)
  - ▶ [Linux](#) (el internet se basa en Linux, también la intranet!)
  - ▶ [OpenSSL](#) (encriptación para conectarnos a bancos, web...)
  - ▶ Y muchísimo más, hoy lo veremos

- ❑ También se le conoce como software de código abierto
  - ▶ Prefiero no usar esta terminología
  
- ❑ Definición según la FSF (Free Software Foundation)
  - ▶ Se han de cumplir cuatro condiciones
    - Se puede **usar para lo que se quiera**
      - **¡ESTO INCLUYE SU USO COMERCIAL!**
    - Se puede **estudiar y modificar todo**, el código fuente es un requisito
    - Se puede **compartir y distribuir sin restricciones**
    - Se pueden **distribuir los cambios**
  
- ❑ Hay muchas licencias que cumplen lo anterior, pero cada una a su manera y no tienen porqué ser compatibles





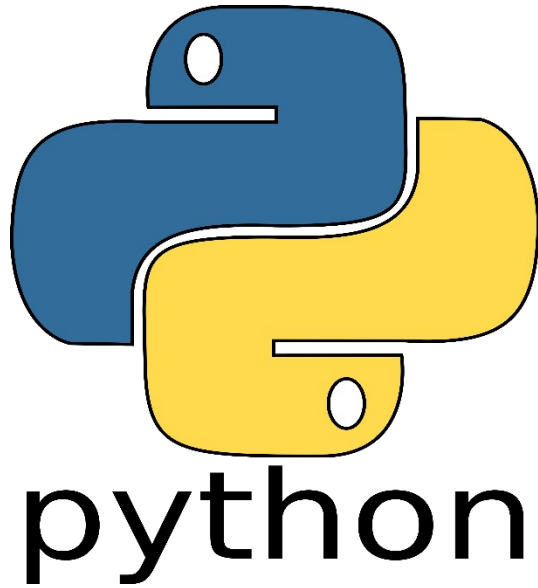
## □ Formas de desarrollo común

- ▶ Centros públicos (dinero del contribuidor)
  - [Public money, public code](#), [FSFE FOSDEM 2023 presentación](#)
- ▶ Proyectos pasionales
- ▶ Proyectos apoyados por la industria (ver Linux, OpenSSL)
- ▶ Proyectos desarrollados por la comunidad
  - Apoyo comunitario (conocimiento, tiempo, ayuda, dinero...)

## □ Formas más puntuales o innovadoras

- ▶ Corporaciones que abren sus soluciones internas
- ▶ Compañías que comercializan software libre
  - **Soporte, documentación/cursos, desarrollo personalizado**
  - *Soluciones privadas ancilares*

# Software libre técnico de aplicación genérica



Python se usa un montón como lenguaje de interfaz y scripting

C++ es probablemente la más común para la base



R, estadística, análisis de datos



Julia es como Python, pero hecha para el S. XXI

Fortran, antiguo pero bien potente





Ada: lenguaje de programación desde sistemas “embebidos” hasta infraestructura

SPARK: parte de Ada que es verificable usando métodos formales

Ada/SPARK se usan en sistemas críticos:

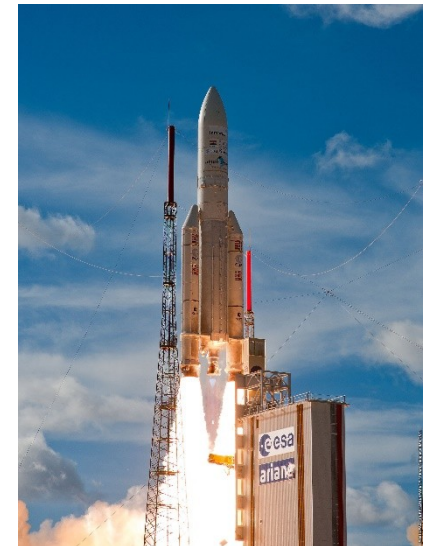
- Eurocontrol (2.3MLOC)
- [TER/Paris Metro](#)
- [Eurofighter](#)
- [Airbus/Boeing](#)
- [Cyberseguridad](#)
- [Petroquímica](#)



Rosetta

100% Ada

Ariane 5

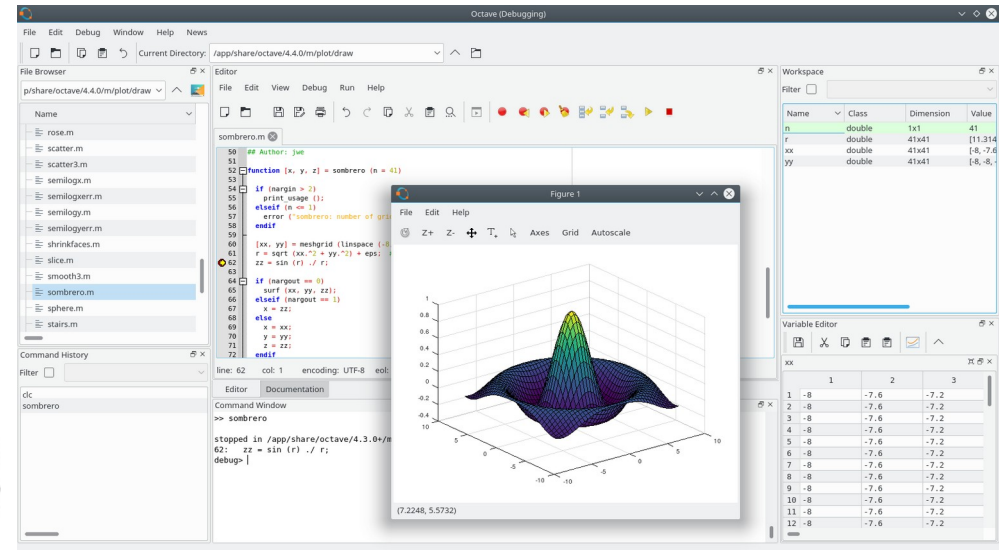
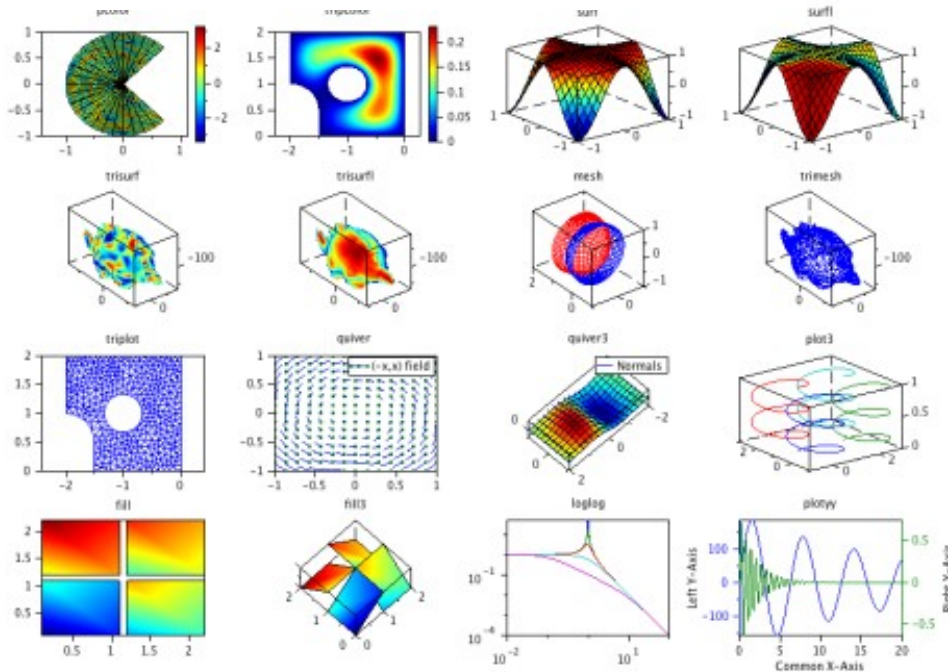
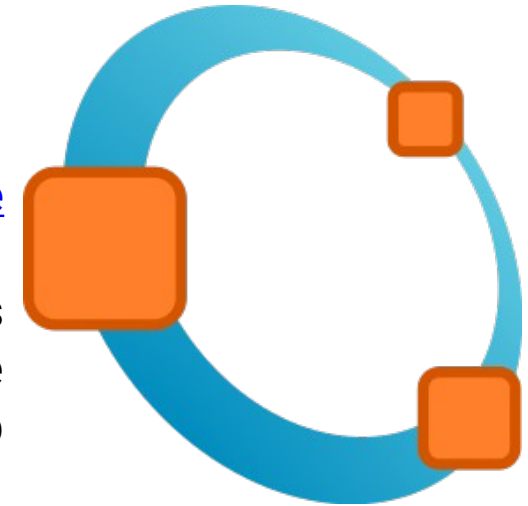


## Alternativas a Matlab



GNU Octave

La sintaxis es mayoritariamente compatible con Matlab





wxMaxima

Sympy



Alternativa a Wolfram,  
Matlab (symbolic)

Los CAS nos permiten  
trabajar directamente  
sobre variables, no de  
forma numérica



Coliop4 - transportation-tupel-data.cmpl

Problem Output Solution

```
%data : plants set, centers set[1], routes set[2] , c[routes] , s[plants] , d[centers]
%display nonZeros

variables:
    x[routes]: real[0..];
objectives:
    costs: sum{ [i,j] in routes : c[i,j]*x[i,j] } ->min;
constraints:
    supplies {i in plants : sum{j in routes *> [i,*] : x[i,j]} = s[i];}
    demands {j in centers: sum{i in routes *> [* ,j] : x[i,j]} <= d[j];}
```

transportation-tupel-data.cmpl  
transportation-tupel-data.cdat

---

|                     |                                |  |  |  |  |
|---------------------|--------------------------------|--|--|--|--|
| Problem             | transportation-tupel-data.cmpl |  |  |  |  |
| Nr. of variables    | 8                              |  |  |  |  |
| Nr. of constraints  | 7                              |  |  |  |  |
| Objective name      | costs                          |  |  |  |  |
| Solver name         | CBC                            |  |  |  |  |
| Display variables   | nonzero variables (all)        |  |  |  |  |
| Display constraints | nonzero constraints (all)      |  |  |  |  |

---

|                  |              |  |  |  |  |
|------------------|--------------|--|--|--|--|
| Objective status | optimal      |  |  |  |  |
| Objective value  | 36500 (min!) |  |  |  |  |

---

| Variables Name | Type | Activity | Lower bound | Upper bound | Marginal |
|----------------|------|----------|-------------|-------------|----------|
| x[1,1]         | C    | 2500     | 0           | Infinity    | 0        |
| x[1,2]         | C    | 2500     | 0           | Infinity    | 0        |
| x[2,2]         | C    | 1500     | 0           | Infinity    | 0        |
| x[2,3]         | C    | 2000     | 0           | Infinity    | 0        |
| x[2,4]         | C    | 2500     | 0           | Infinity    | 0        |
| x[3,1]         | C    | 2500     | 0           | Infinity    | 0        |

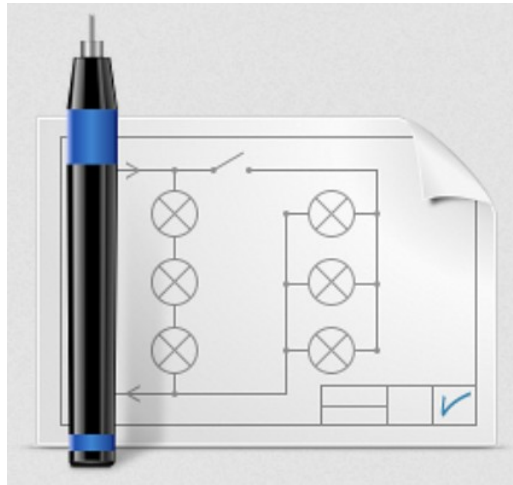
---

| Constraints Name | Type | Activity | Lower bound | Upper bound | Marginal |
|------------------|------|----------|-------------|-------------|----------|
| supplies[1]      | E    | 5000     | 5000        | 5000        | 3        |
| supplies[2]      | E    | 6000     | 6000        | 6000        | 6        |
| supplies[3]      | E    | 2500     | 2500        | 2500        | 2        |
| demands[1]       | L    | 5000     | -Infinity   | 6000        | 0        |
| demands[2]       | L    | 4000     | -Infinity   | 4000        | -1       |
| demands[3]       | L    | 2000     | -Infinity   | 2000        | -4       |
| demands[4]       | L    | 2500     | -Infinity   | 2500        | -3       |

Alternativa a ILOG  
CPLEX, Gurobi, AMPL,  
etc

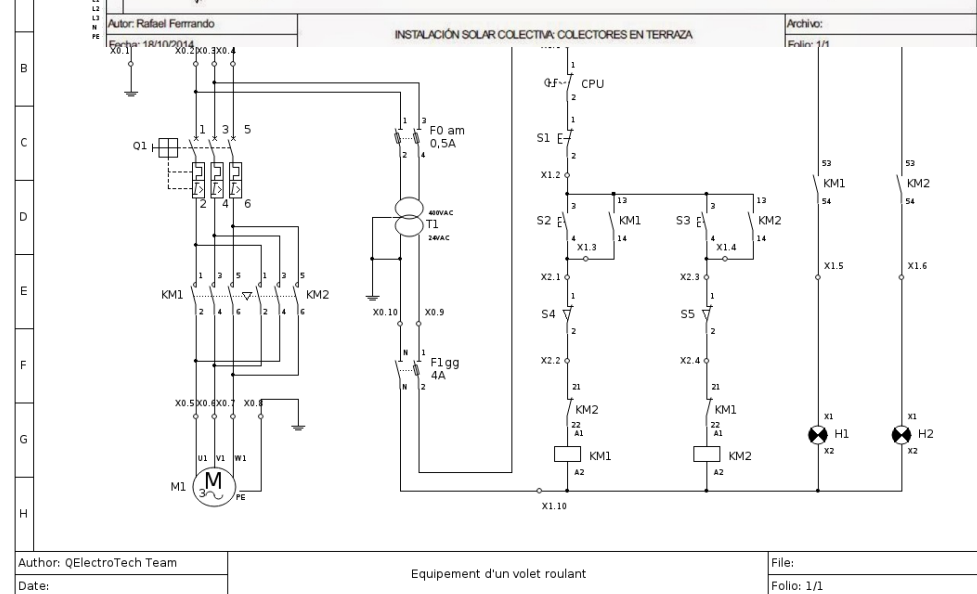
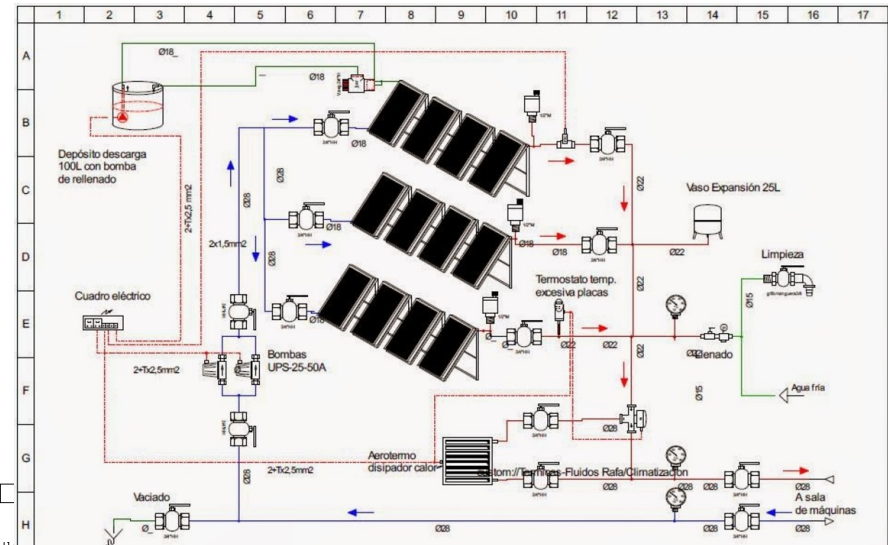
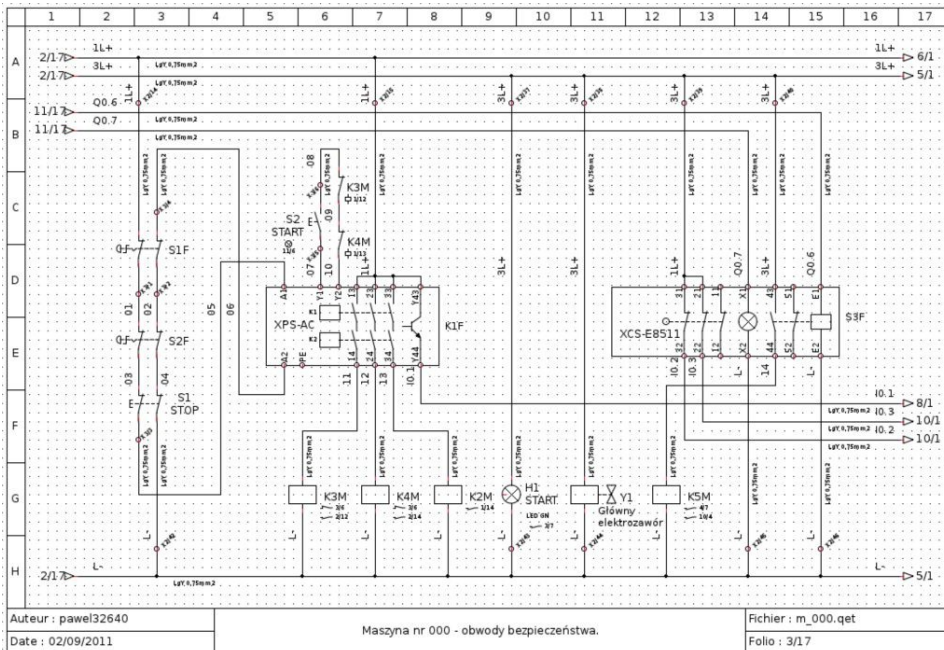
Conjunto de  
herramientas de  
optimización MINLP.



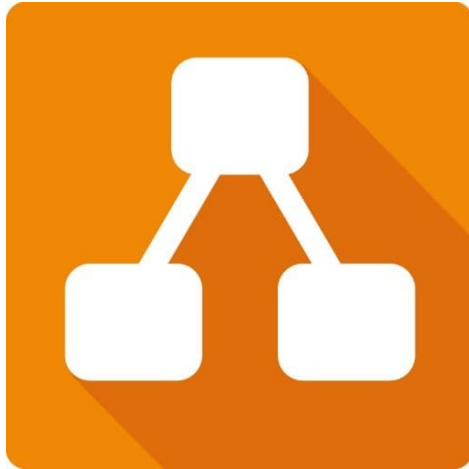


## QElectroTech

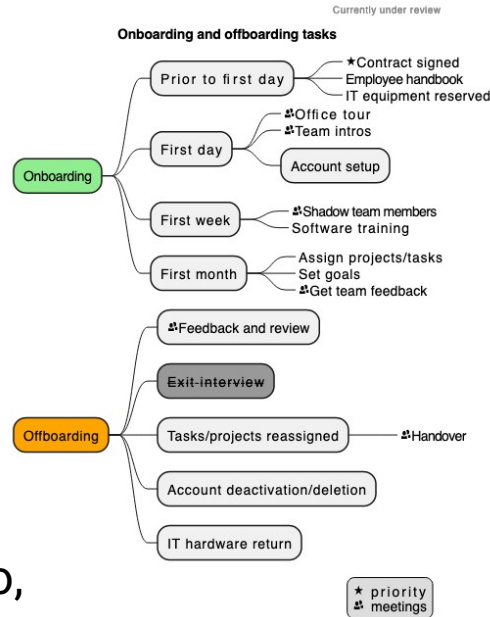
Diagramas hidráulicos, eléctricos, electrónicos, de control, etc. Sigue estándar IEC 60617



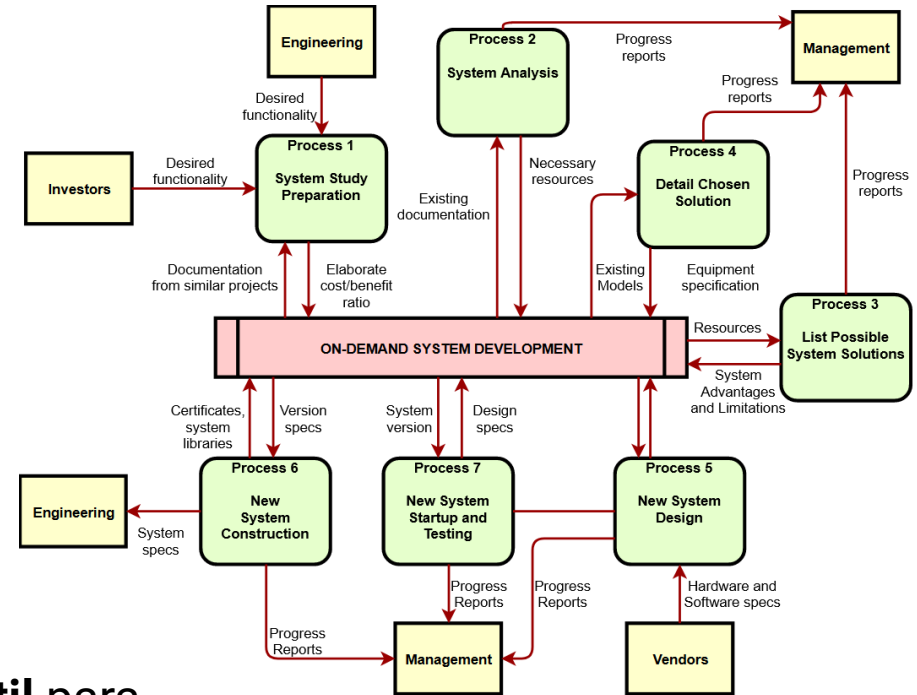
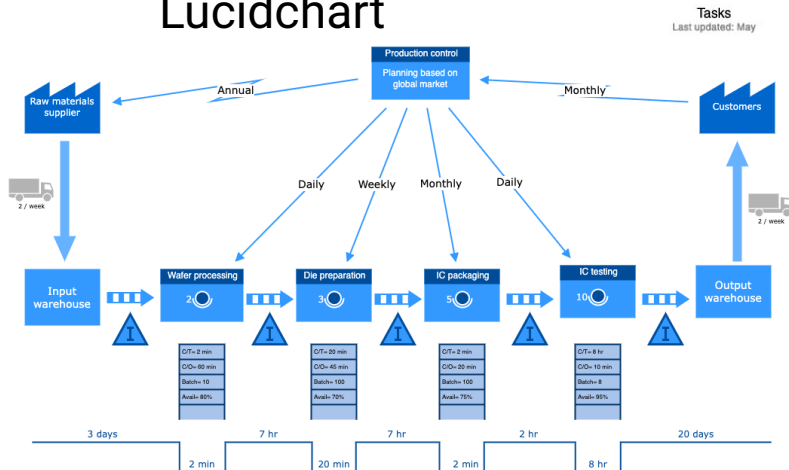




## Diagrams

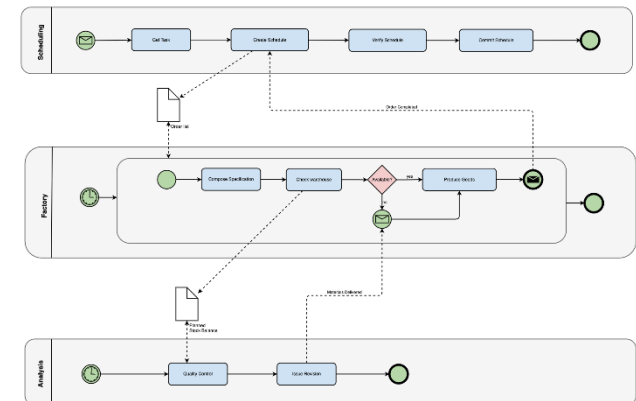


## Alternativa a MS Visio, Lucidchart



Muy útil para hacer sinópticos técnicos (P&IDs, flujos...)

**¡YA VALIDADO!**



# M<sup>++</sup> Mutation

Multicomponent Thermodynamic And Transport properties for IONized gases in C++

Librerías para ionización e interacción molecular (reacciones)



**Reaktoro**  
for Python and C++



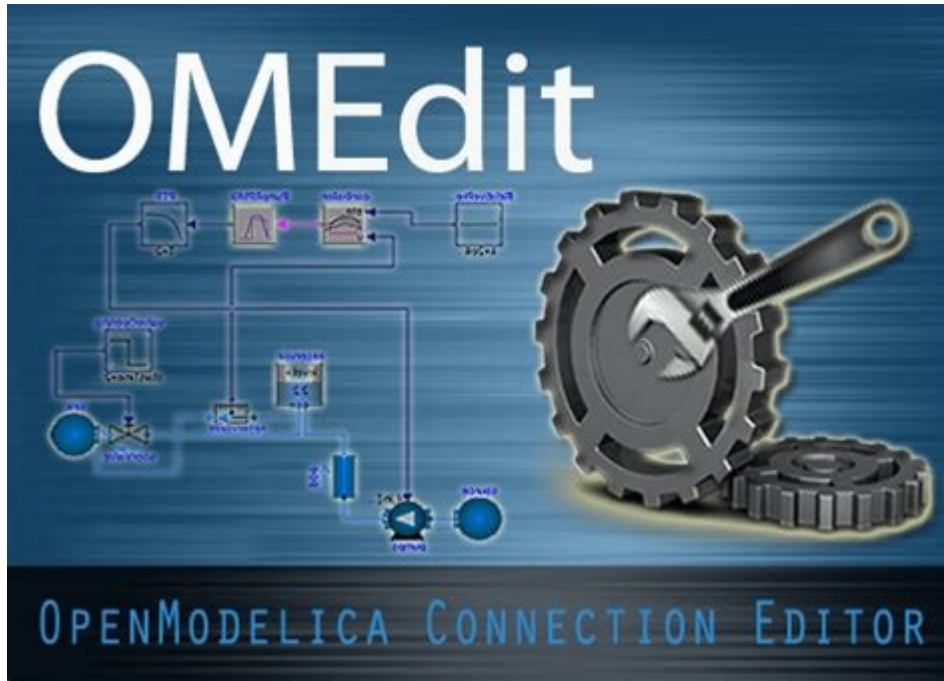
# Cantera

Alternativa a CHEMKIN. Combustión, modelado de cinemática química

# CoolProp



Alternativa a REFPROP. Tiene mil interfaces, muy útil como calculadora



Alternativa a Dymola, SimulationX, Wolfram System Modeler, Simulink...

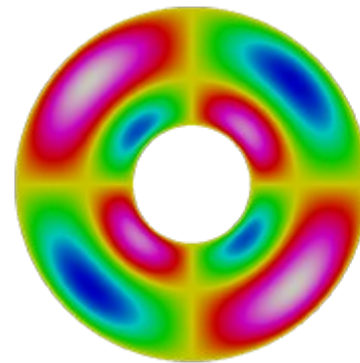
Ya está en uso industrial de gran escala: [BOSH, ABB, DHI, Molten Salt Solar Power](#)

...

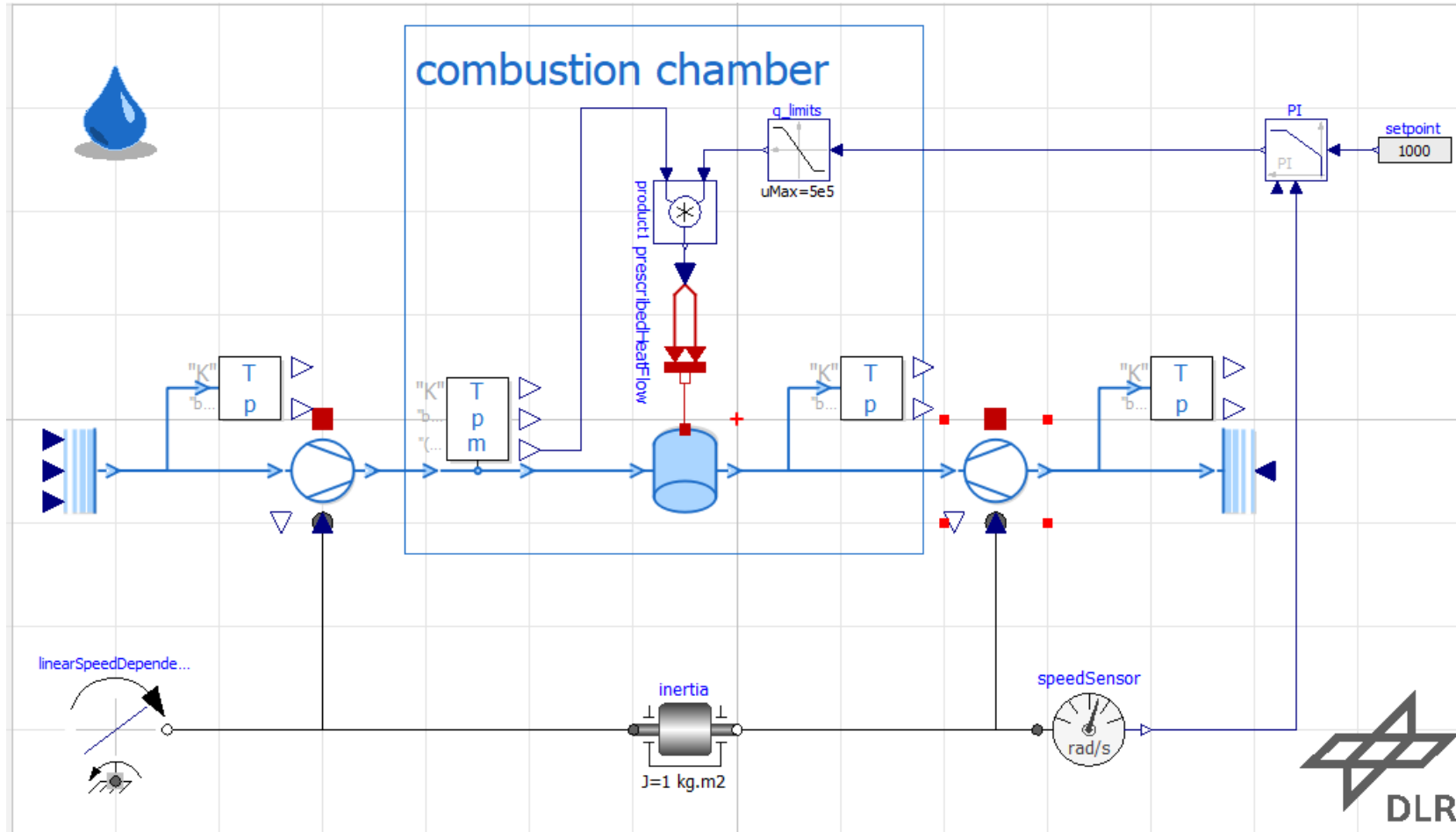
Basado en el lenguaje estandarizado Modelica

Alternativa a COMSOL, ~ANSYS

Simulación multifísica por elementos finitos o partículas

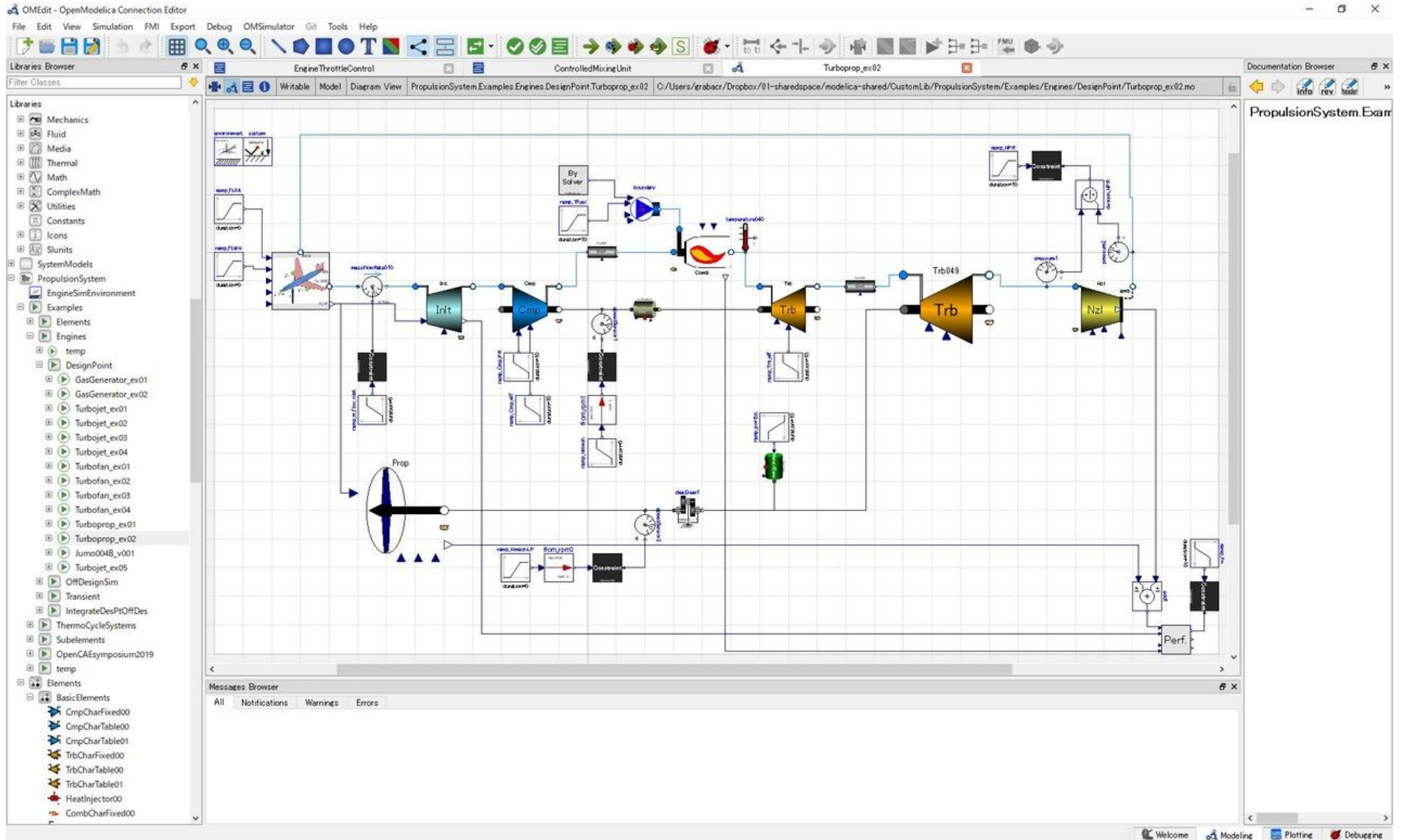


# Elmer

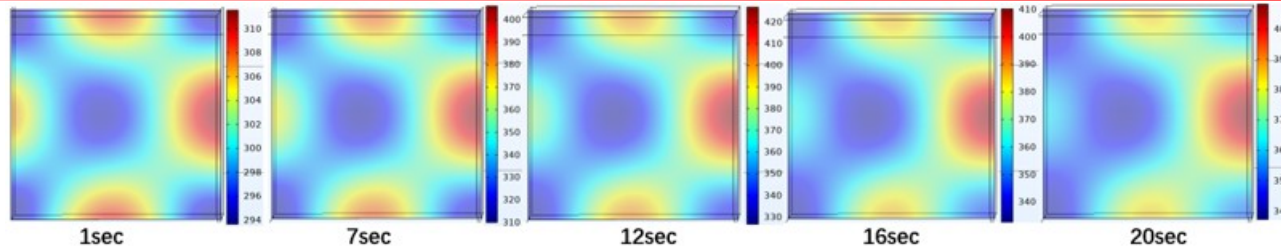


Simulación de sistemas fluidos, mecánicos, eléctricos, químicos, control, etc. Muy, muy capaz.

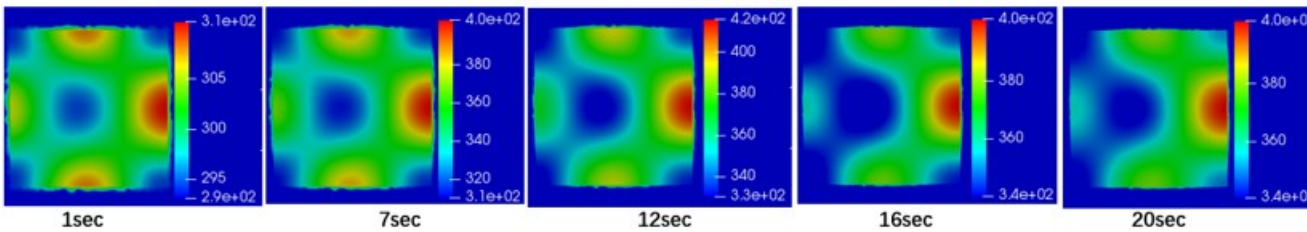
Ejemplo: simple simulación de una turbina de gas.



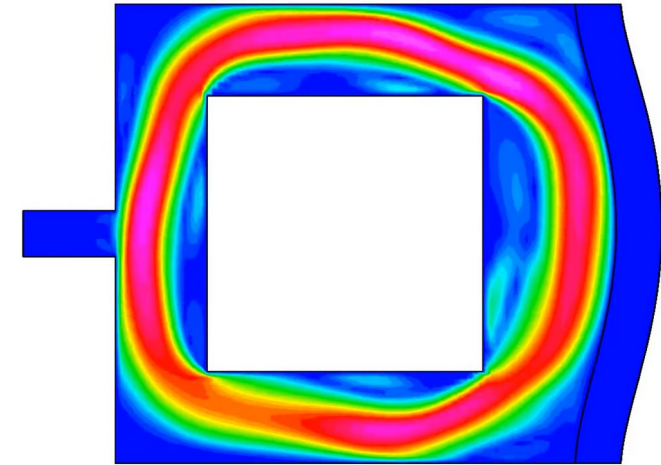
The screenshot displays the OpenModelica Connection Editor interface. The main workspace shows a complex simulation model of a turbojet engine. Key components visible include a propeller (Prop), a compressor (Cmp), a combustion chamber (Comb), and two turbines (Trb). The model is interconnected with various sensors and control elements. The Libraries Browser on the left provides a hierarchical view of the model's components, including 'Mechanics', 'Fluid', 'Thermal', and 'SystemModels'. The Messages Browser at the bottom shows a list of notifications, warnings, and errors.



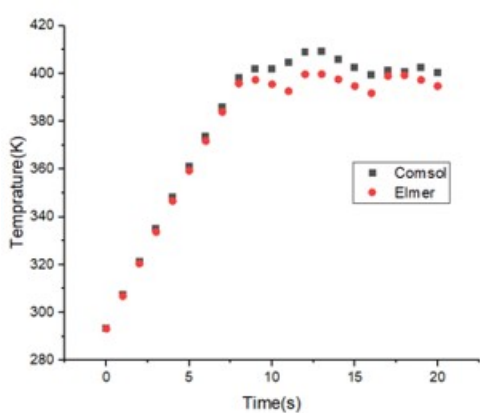
COMSOL



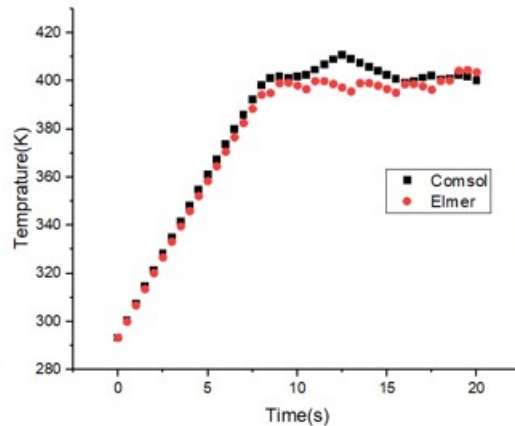
ElmerFEM



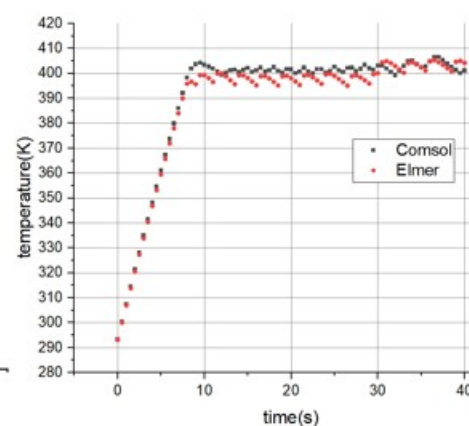
FSI acoplado:  
membrana flexible



time step (0,1,20)



(0,0.5,20)



(0,0.5,40)

Calentamiento de una patata en un microondas con control explícito de la radiación... ¿Girotrón en un stellarator?

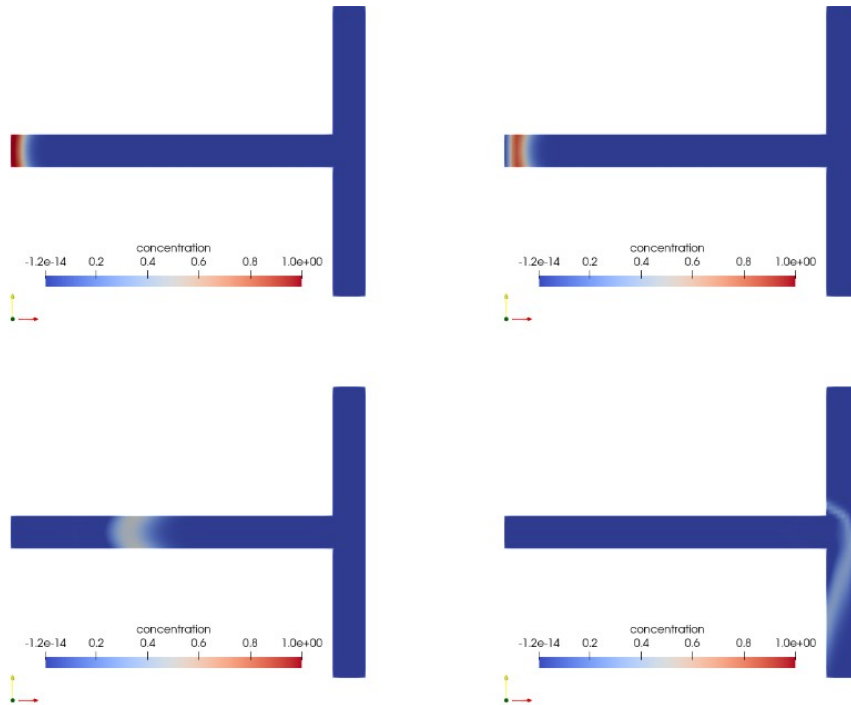


Figure 29.3: Concentration at time: 0, 2, 15, and 45 ticks

Electro-ósmosis

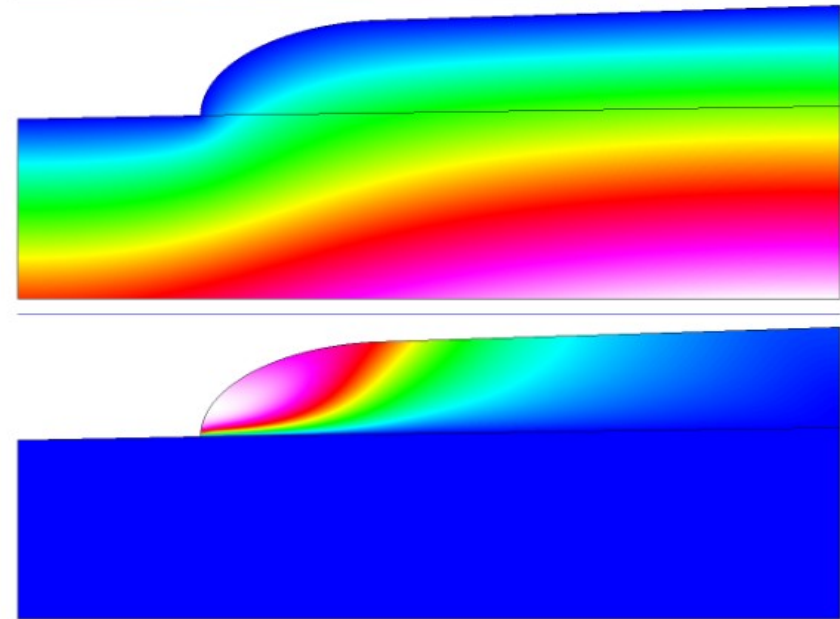


Figure 27.3: Temperature (upper figure) and velocity (lower figure) distributions of the toy glacier sitting on a bedrock.

Glaciar sobre roca. Termo-mecánica

Hay acústica, electromagnetismo, radiación térmica, DEM, adaptación de malla...



Sistemas de simulación genérica y manual. Interesantes para aplicaciones específicas.

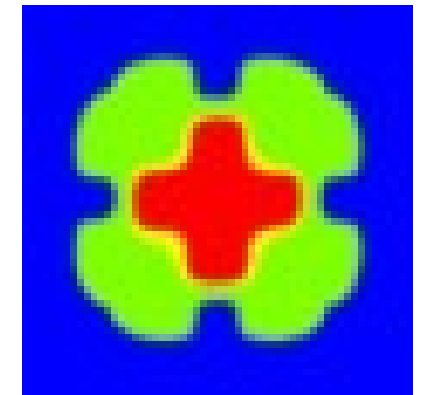


FEniCSx

No hay equivalente propietario

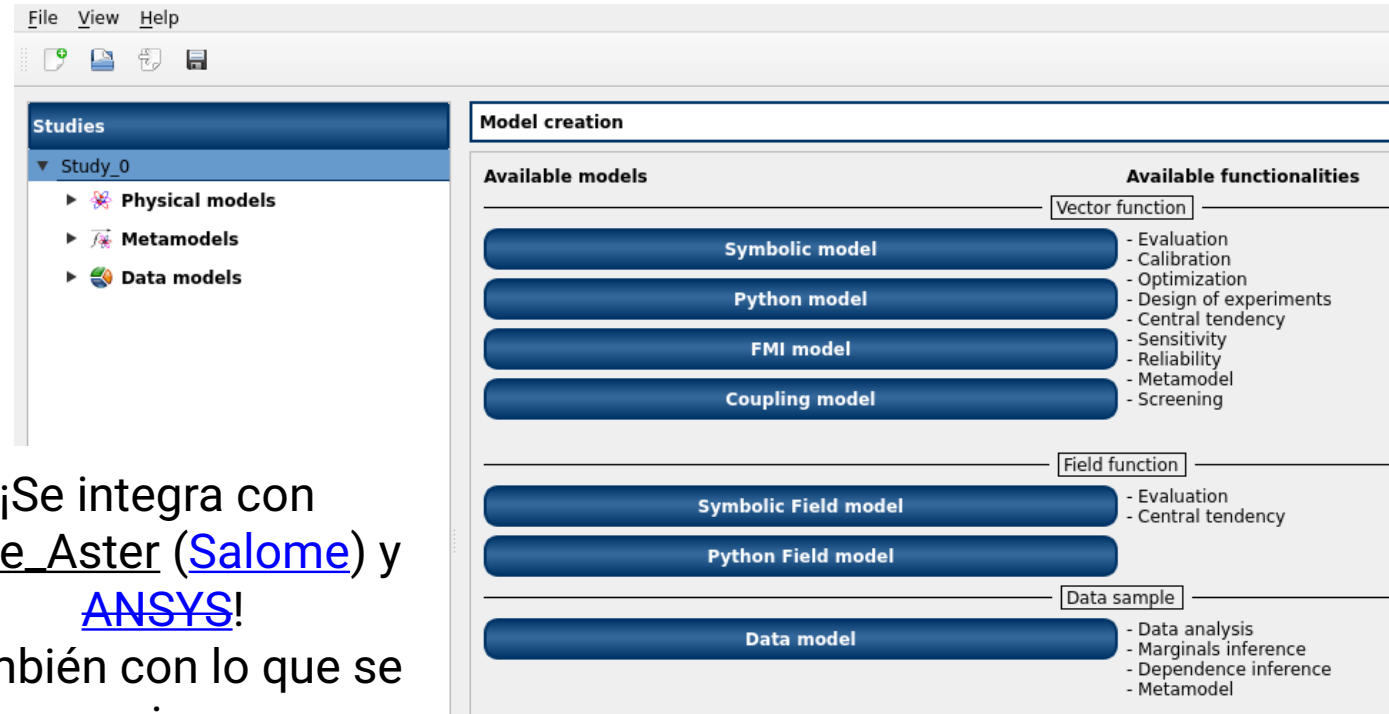


# FREEFEM

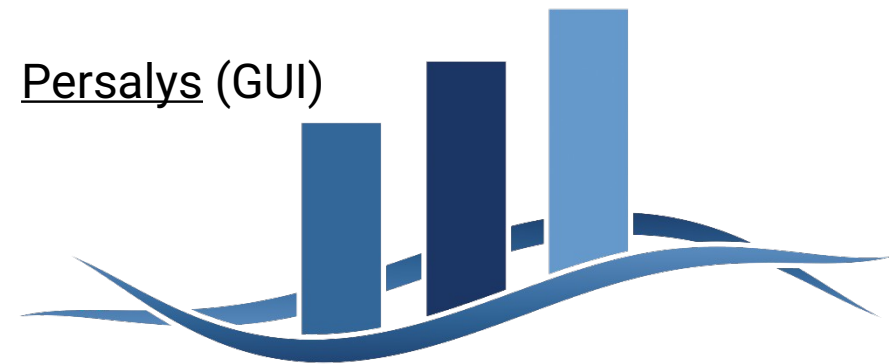


deal.II





¡Se integra con Code\_Aster ([Salome](#)) y [ANSYS](#)!  
También con lo que se quiera





Cuantificación de incertidumbre, optimización y análisis de datos.

Se usa bastante en el **sector nuclear** y aeroespacial. Se integra en unas cuantas suites de optimización potentes



# RAVEN

Es otra posibilidad (INL). También en uso nuclear: [RELAP5-3D](#), [MELCOR](#), [SCALE](#)...

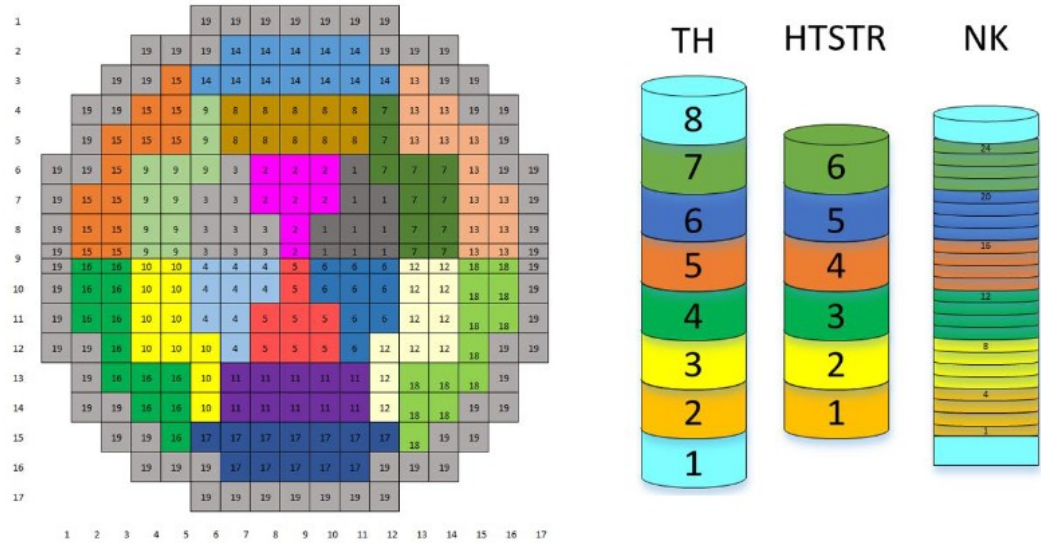


Figure 2 - TRACE TH and HTSTR models, TH-HTSTR-NK mapping

### 3. UNCERTAINTY PROPAGATION METHODOLOGY

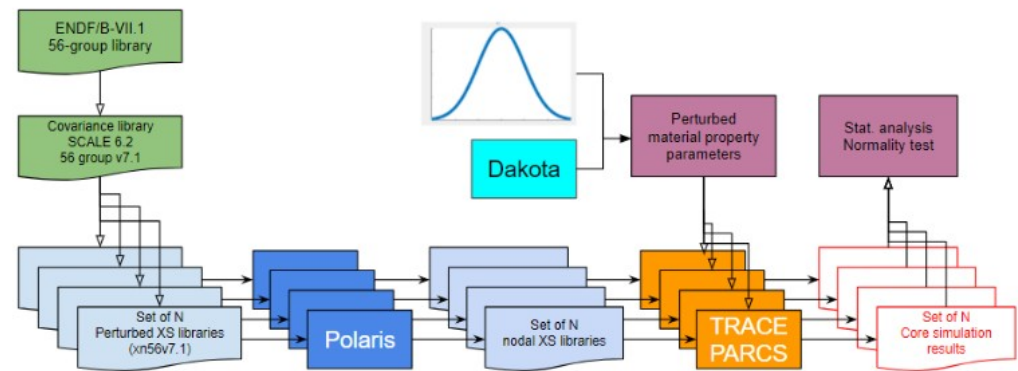
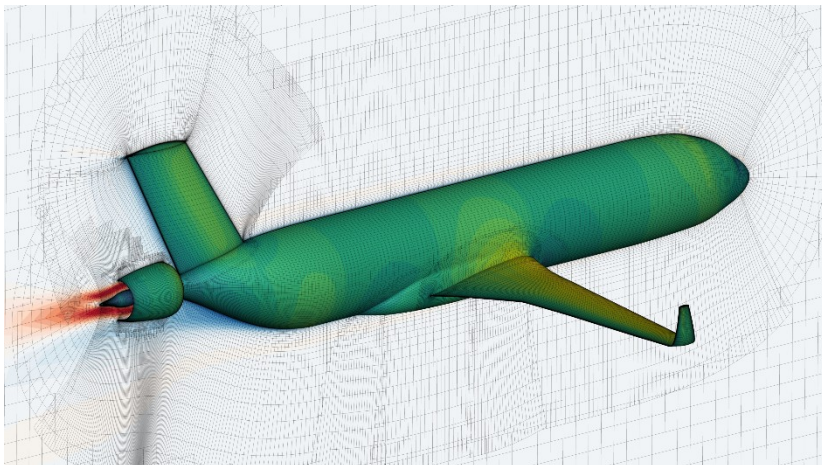


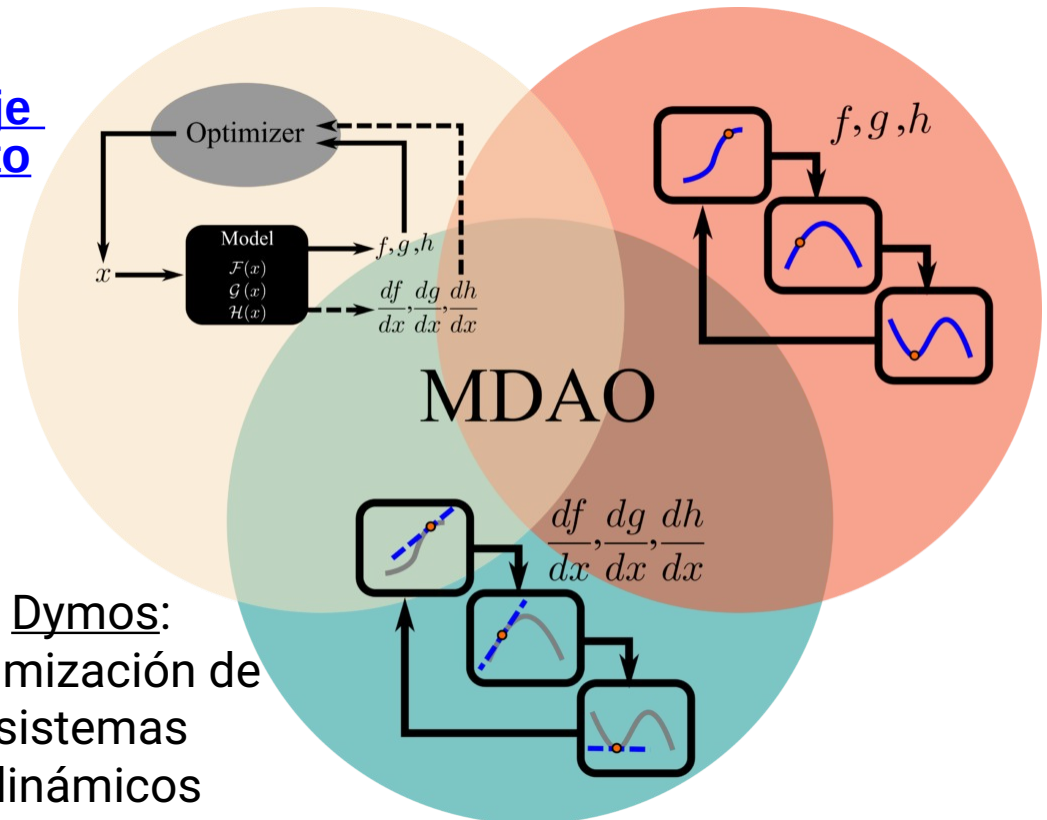
Figure 3 - Uncertainty propagation from nuclear data and material properties

# openMDAO

Libro de aprendizaje excepcional gratuito



Se usa mucho en el sector aeroespacial

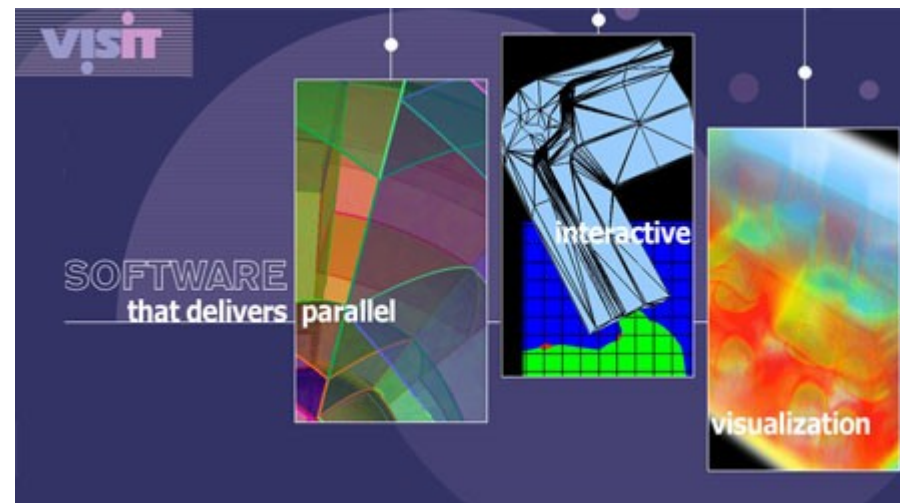


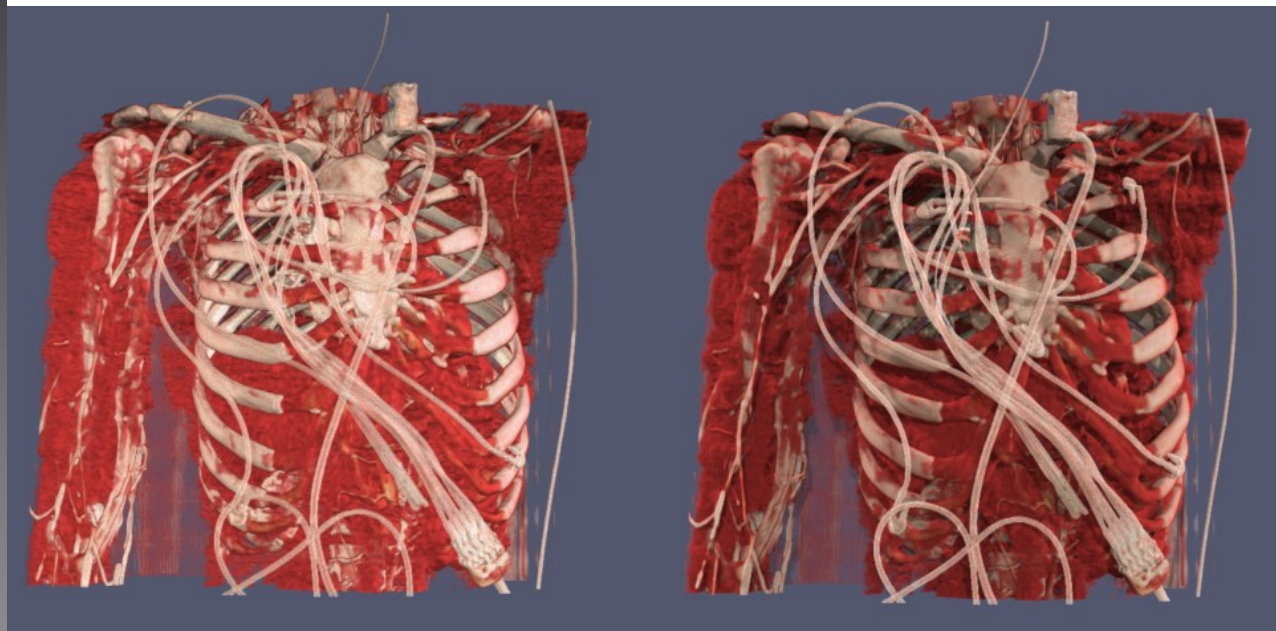
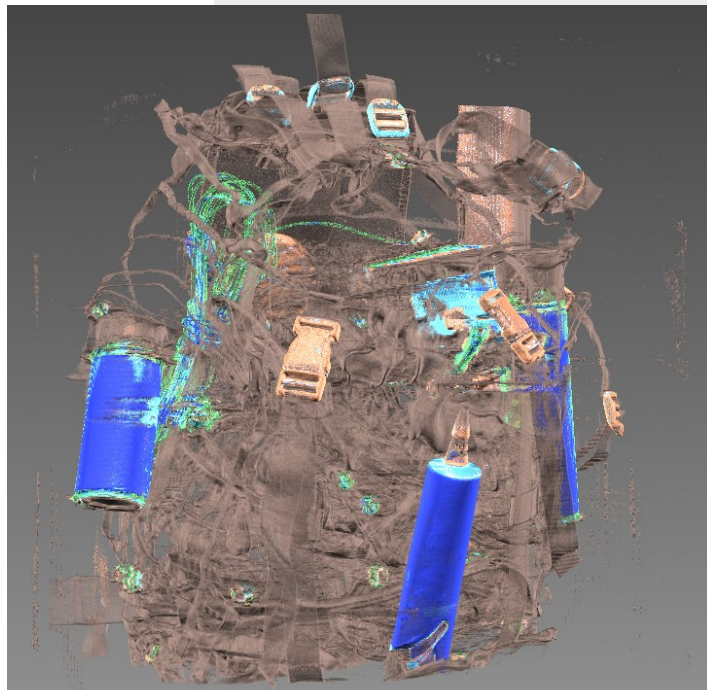
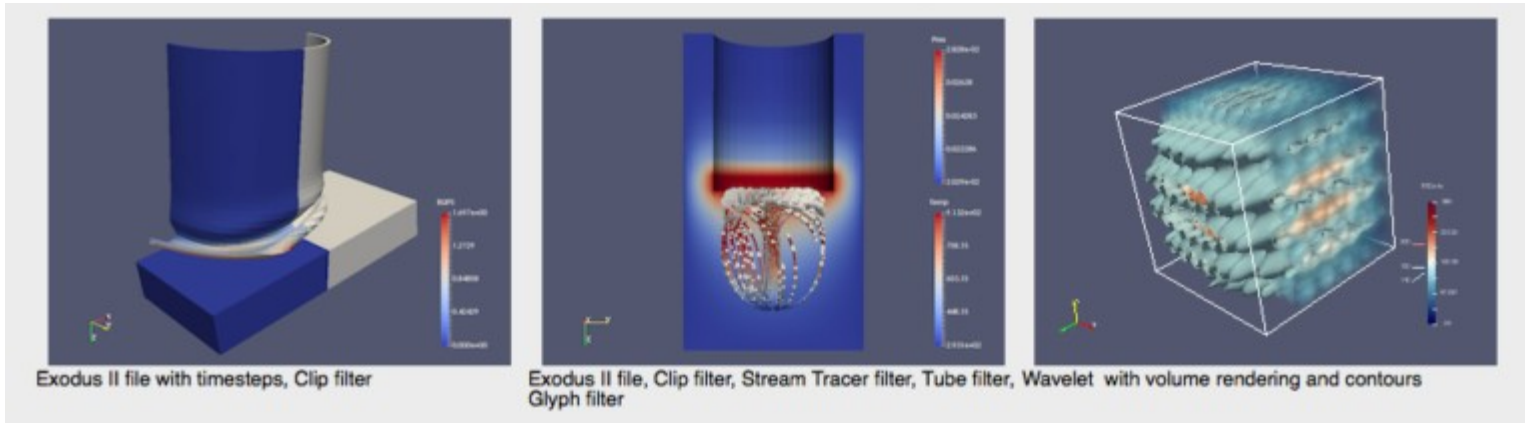
Dymos:  
optimización de sistemas dinámicos



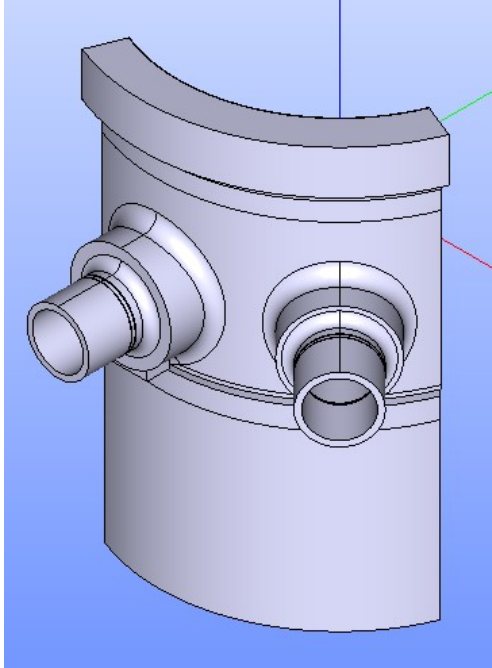
# ParaView

Titanes industriales,  
“crème de la crème”

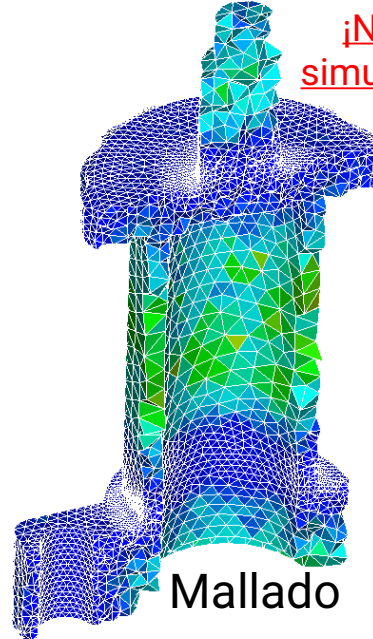
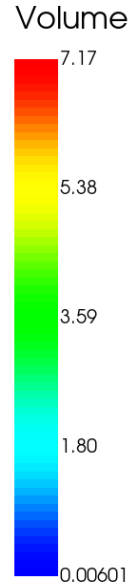




## SALOME

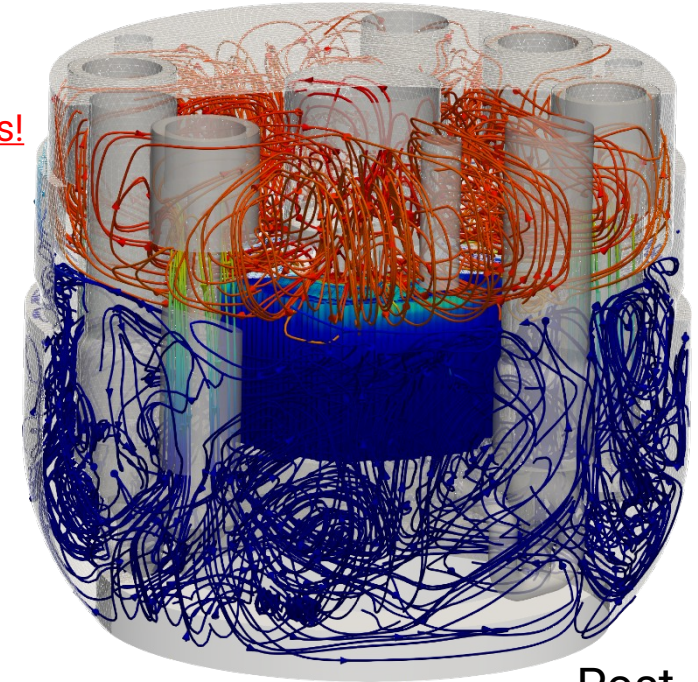


CAD

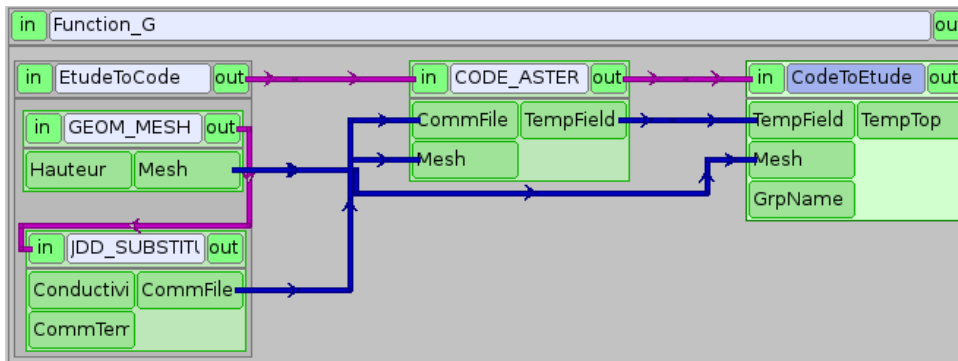


Mallado

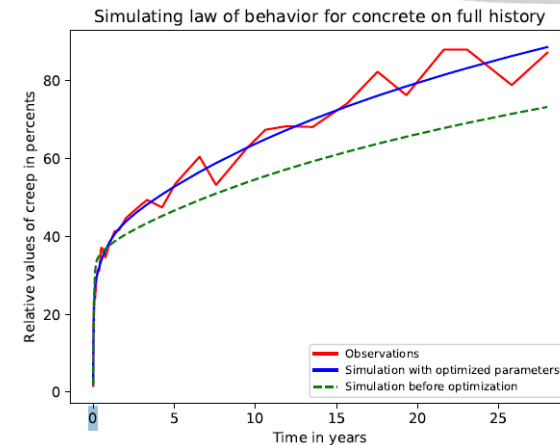
¡No trae simuladores!



Post-procesado



Automatización



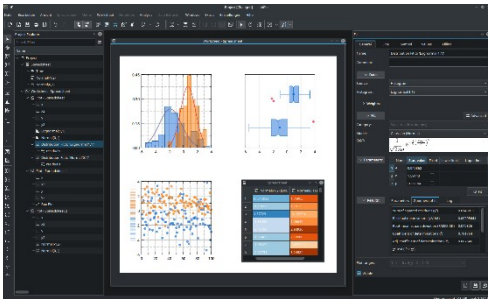
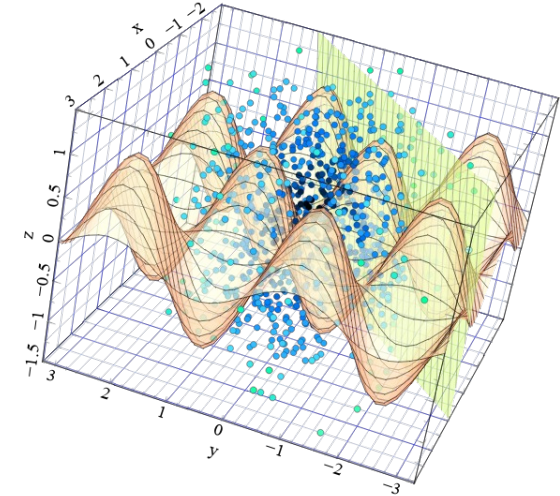
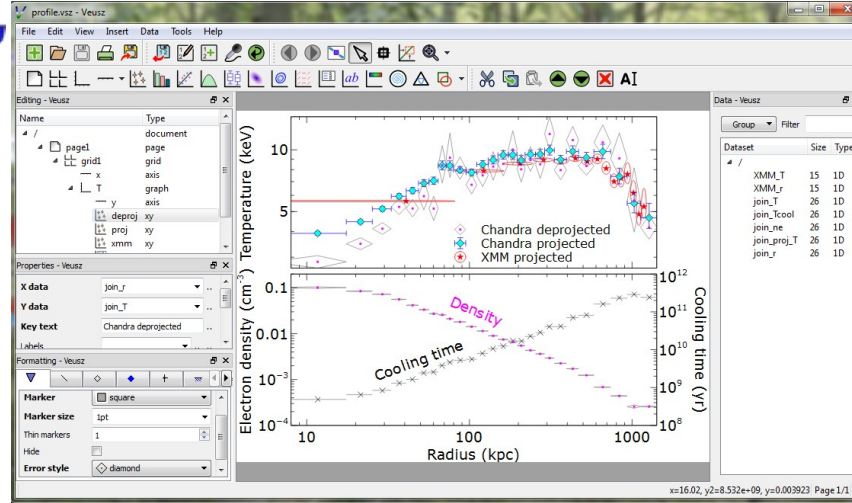
Ingestión de datos

## ❑ Usuarios de Salome y sus modificaciones





Alternativas a Origin



LabPlot

gnuplot es muy manual pero bien potente y automatizable



CERN: [ROOT](#)



gnuplot



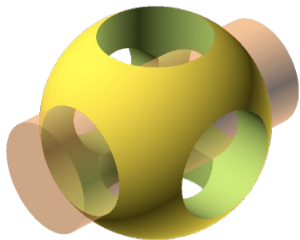
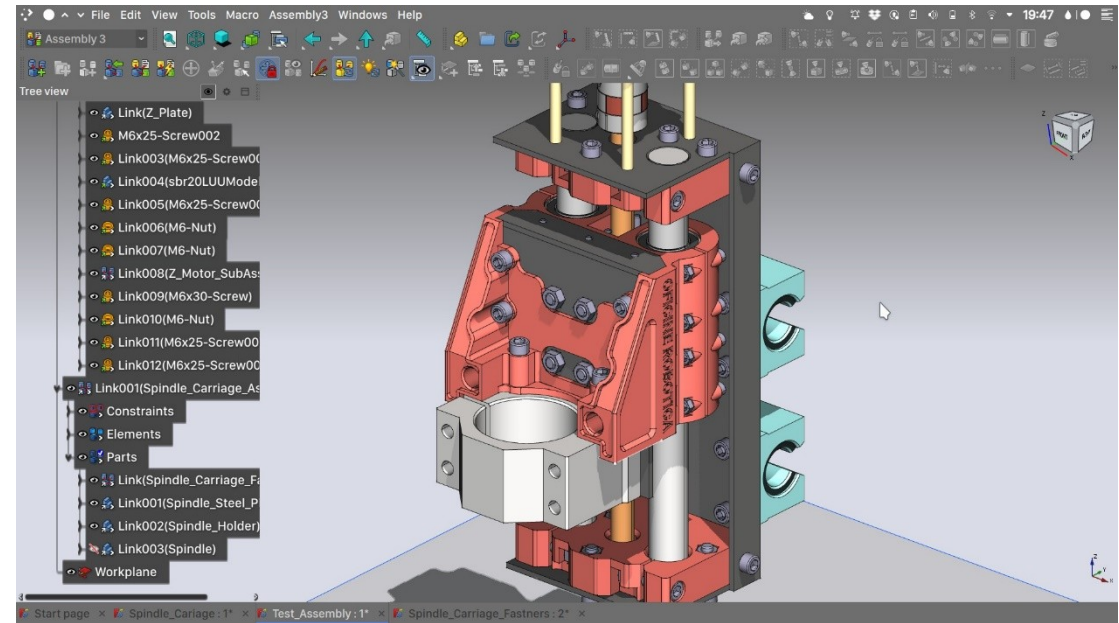
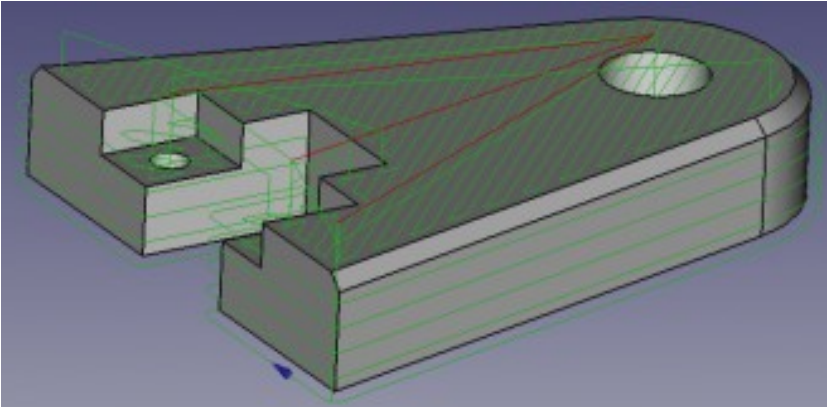


# Software libre en la ingeniería termo-hidro-mecánica



## FreeCAD

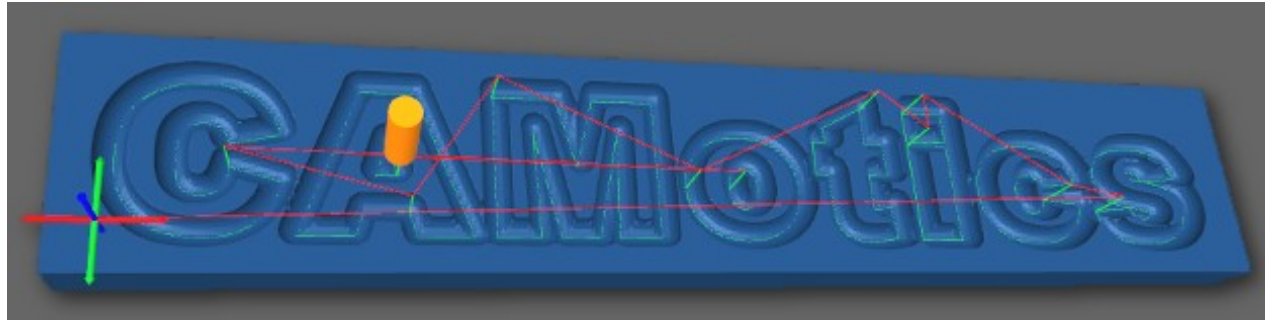
Alternativa **básica**  
a Catia,  
SolidWorks, Solid  
Edge, Fusion



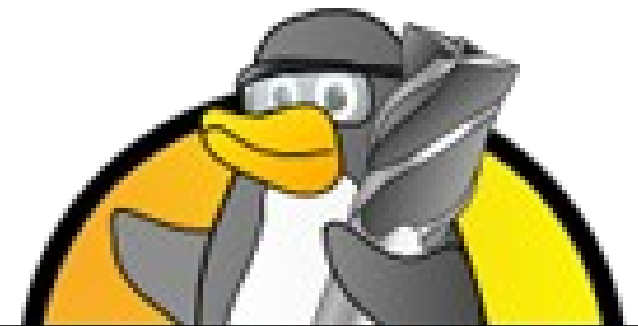
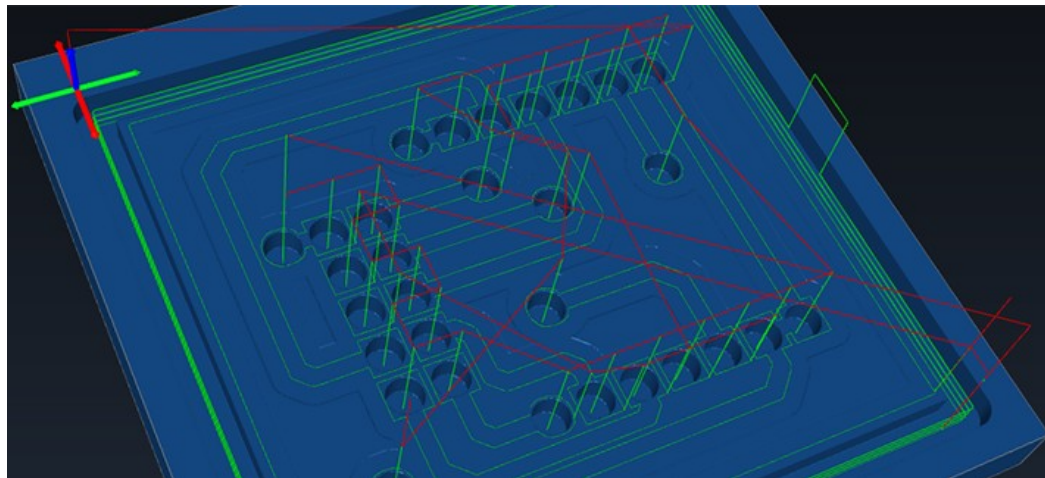
## OpenScad

CAD paramétrico, programable.  
Incluido en FreeCAD





Kiri:Moto



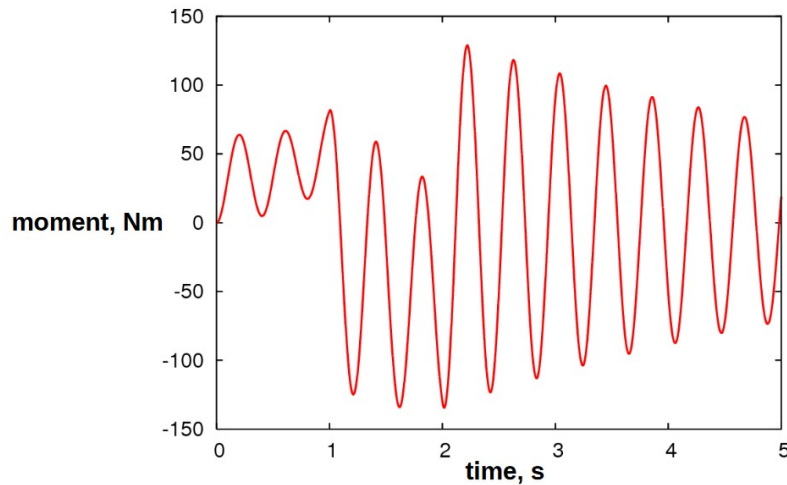
**LinuxCNC**

**SOLO CONTROL, N ejes**

Actualmente (2023), limitados a generación de 4 o 3+2 ejes

# MBDyn

- Internal bending moment close to actuator connection



Example: Hydraulically Actuated Beam 31

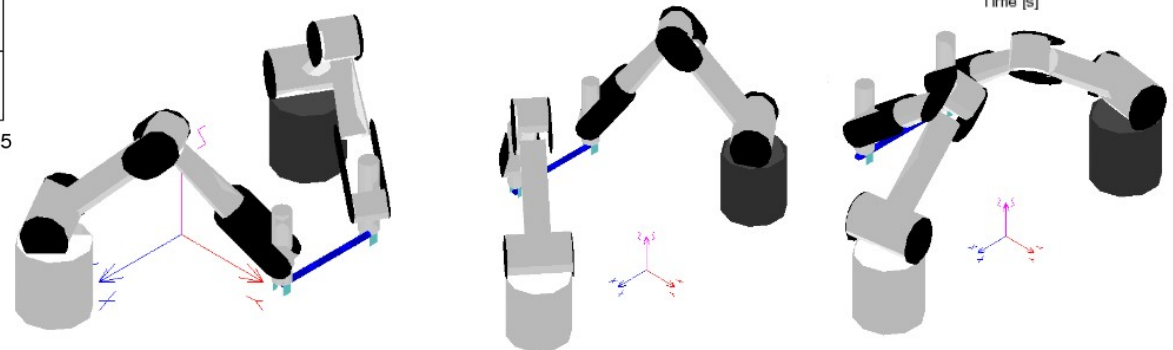
**MBDyn**

- From: J. Mäkinen, A. Ellman, R. Piché, "Dynamic Simulations of Flexible Hydraulic-Driven Multibody Systems using Finite Strain Beam Theory", 5<sup>th</sup> Scandinavian International Conference on Fluid Power, Linköping, 1997, Sweden

The schematic diagram illustrates a hydraulic actuator system. A flexible beam is connected to a rigid body (mass) at one end and a revolute hinge at the other. The beam is actuated by a hydraulic cylinder, which is connected to a pipe line. The pipe line has an orifice and is subjected to an imposed flow. The hydraulic cylinder is connected to a prismatic joint. The actuator is connected to the beam at a point labeled  $C_1$ . The revolute hinge is connected to the beam at a point labeled  $C_0$ .

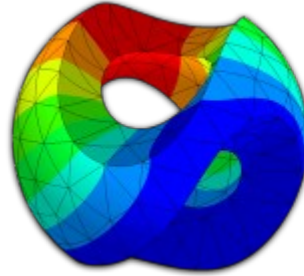
- Input file: <https://www.mbdyn.org/userfiles/documents/examples/actuator>

Pierangelo Masarati – MBDyn Hydraulic Modeling POLITECNICO DI MILANO

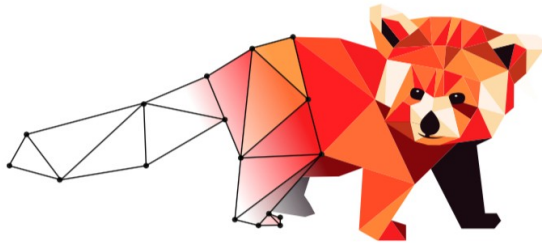




gms h



Netgen/NGSolve



Upgrade  
your meshes

[Mmg Platform](#)

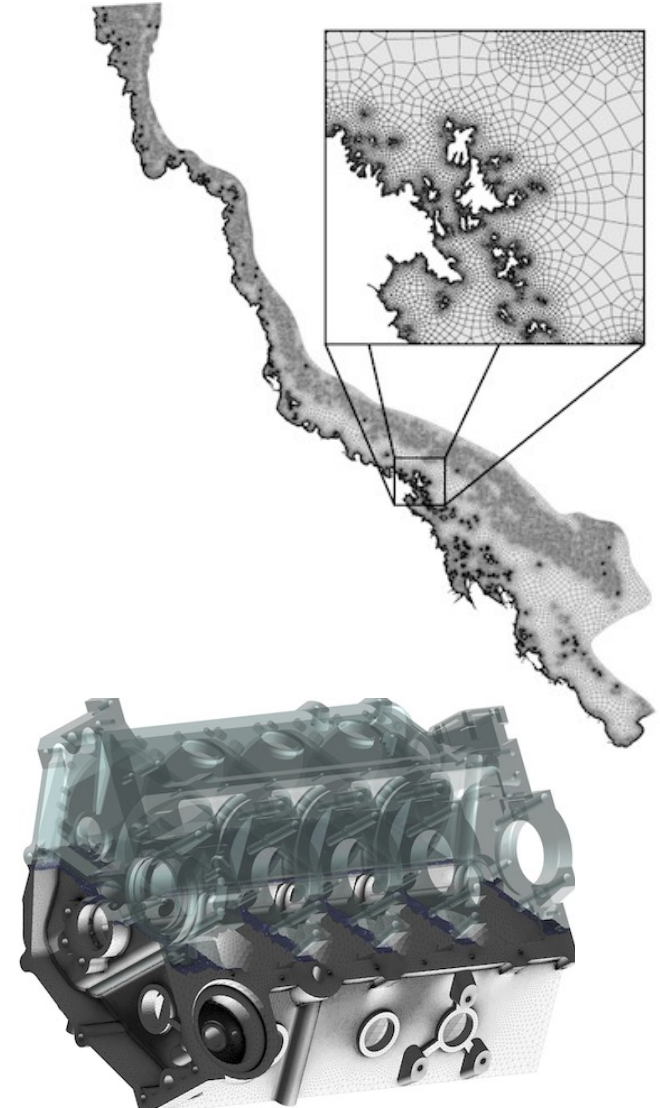
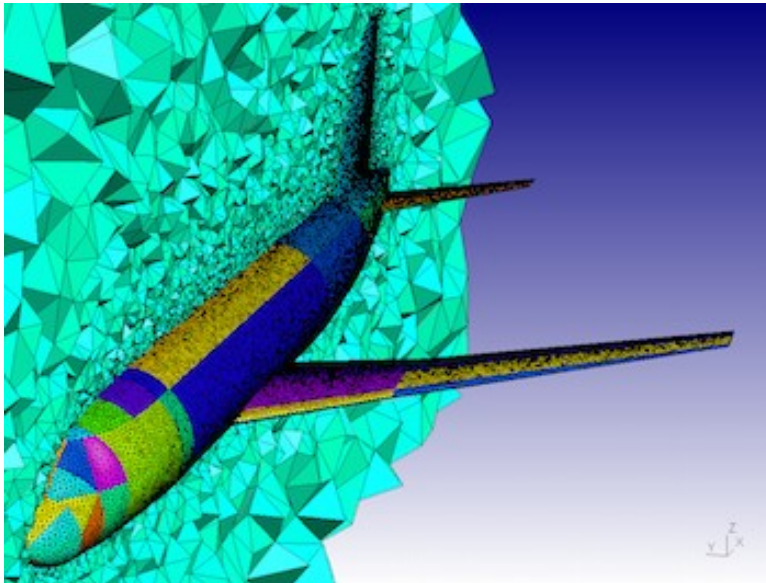
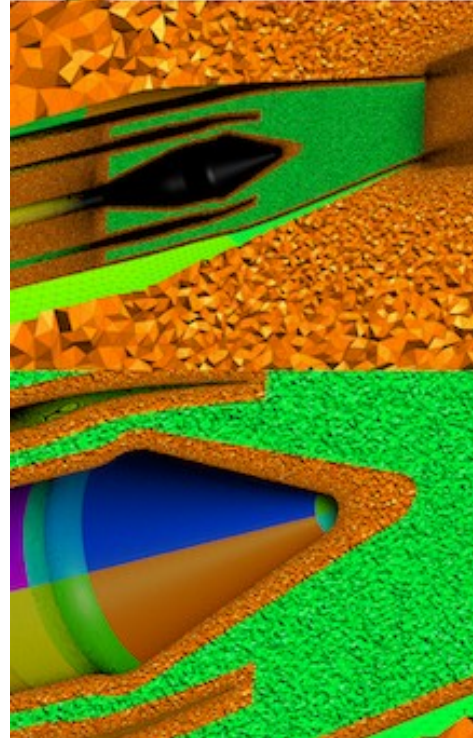
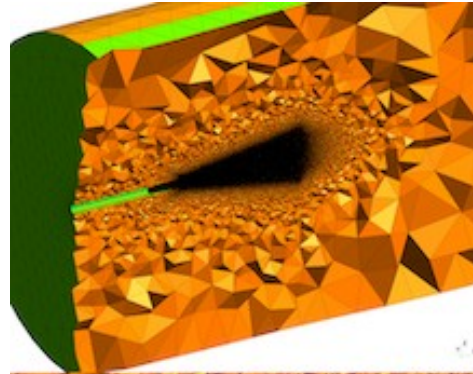
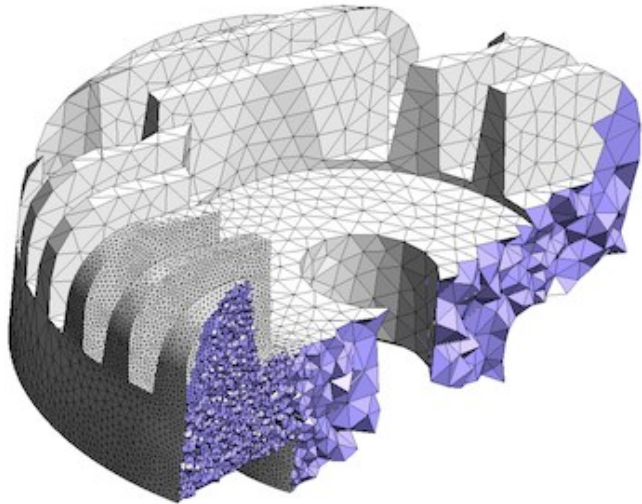


[cfMesh](#)



[MeshLab](#)

Manipulador de geometría para  
escaneos, análisis, etc

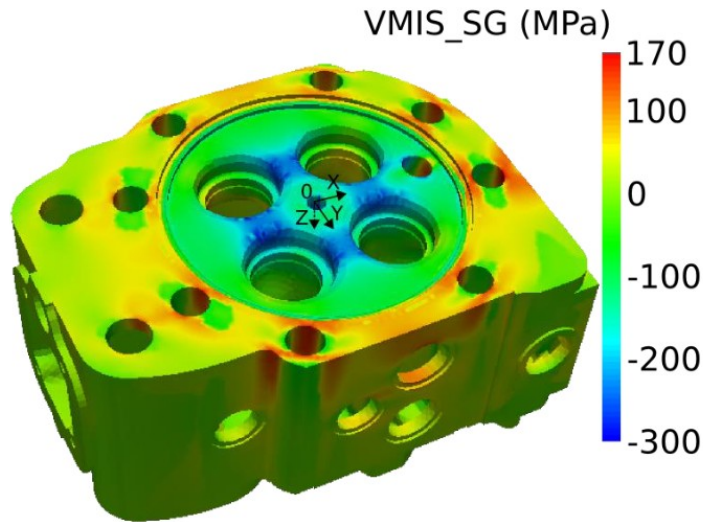




Salome + Code\_Aster

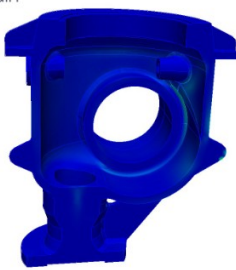
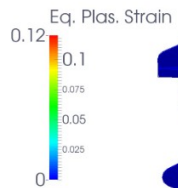
- ❑ Desarrollado por EDF para estudios mecánicos y civiles
  - ▶ Validación de centrales nucleares y sus componentes
  - ▶ Validación de estructuras de generación eléctrica
  - ▶ Validación de estructuras civiles
  
- ❑ Code\_Aster puede hacer prácticamente todo
  - ▶ Eficiente uso de recursos (orientado a superordenadores)
  - ▶ Software libre, se puede modificar todo
  - ▶ Automatización completa (Python)
  - ▶ Materiales avanzados sin límite (complejidad de uso alta...)
  - ▶ Modelos mecánicos sin límite
  - ▶ **¡Algo manual y no es trivial de usar! Ya daré un curso**



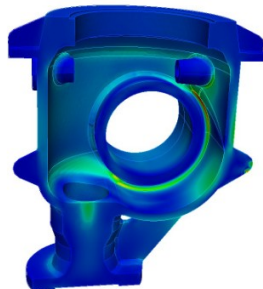


End of start

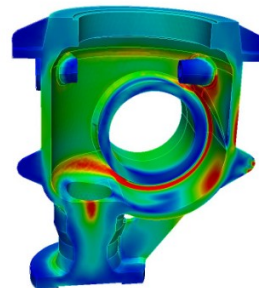
Déformations plastiques équivalentes à 200000h de fluage



Lemaitre



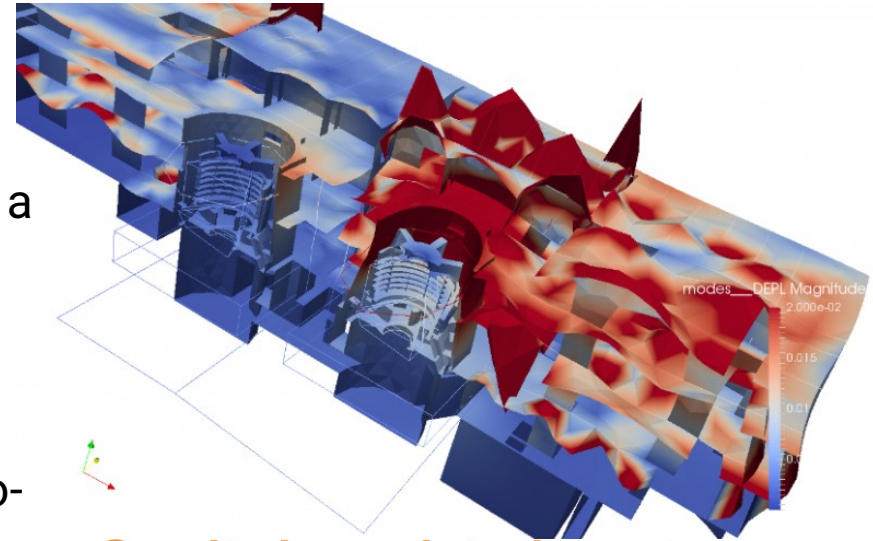
Hayhurst – S2



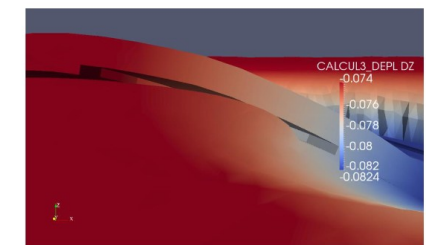
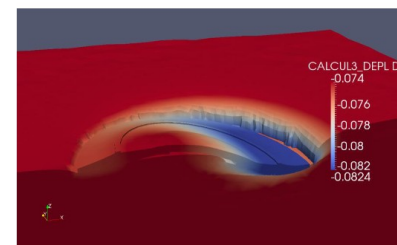
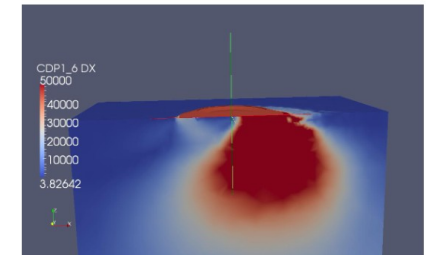
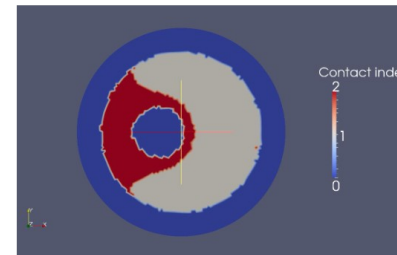
Hayhurst – S1

Alternativa a  
Abaqus,  
ANSYS,  
Nastran

Solo termo-  
(hidro)-  
mecánica

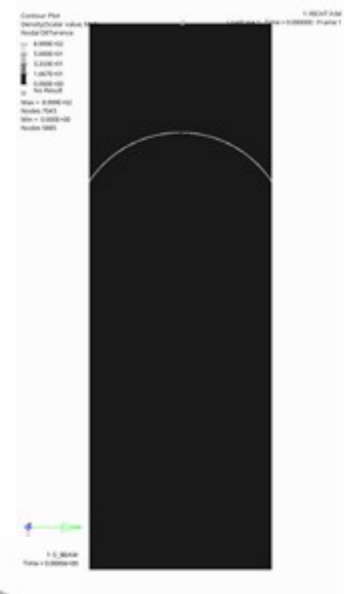
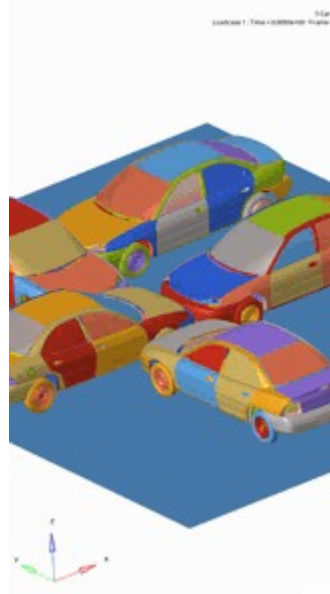


## Gravity base detachment



Simulación explícita,  
implícita y multifísica:  
FEM, SPH, CFD

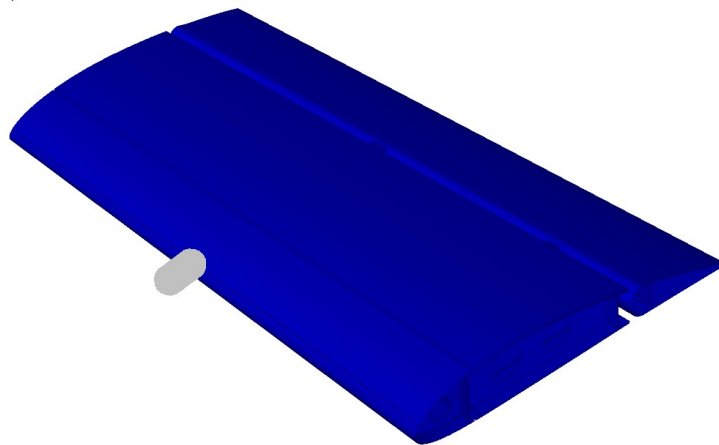
Alternativa directa a **LS-DYNA** (compatible con su input)



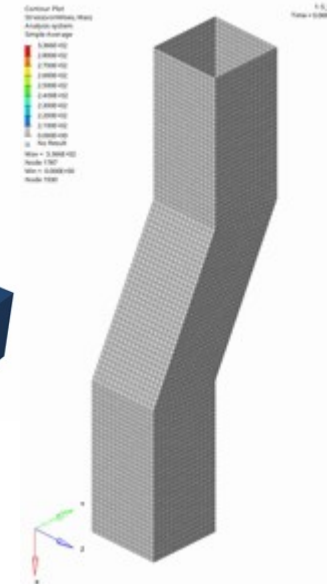
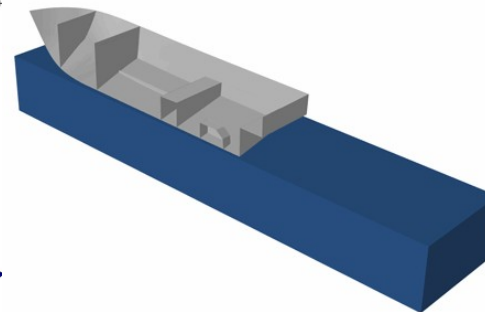
Contour Plot  
Von Mises(Scalar value, Mid)

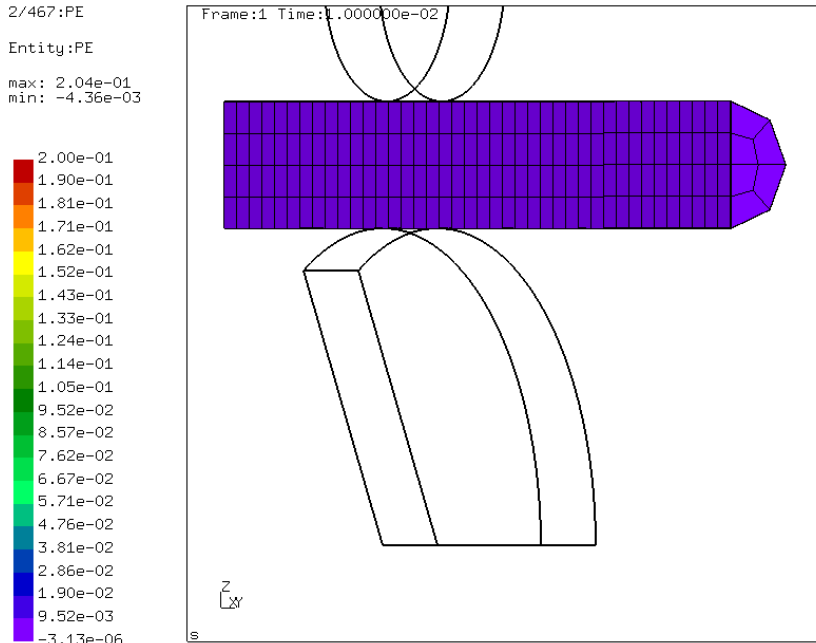
|           |
|-----------|
| 2.869E+02 |
| 2.550E+02 |
| 2.232E+02 |
| 1.913E+02 |
| 1.594E+02 |
| 1.275E+02 |
| 9.564E+01 |
| 6.376E+01 |
| 3.188E+01 |
| 0.000E+00 |
| No Result |

Max = 2.869E+02  
SHELL 119409  
Min = 0.000E+00  
BEAM 1



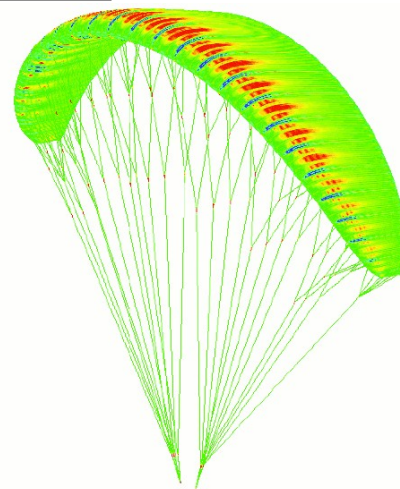
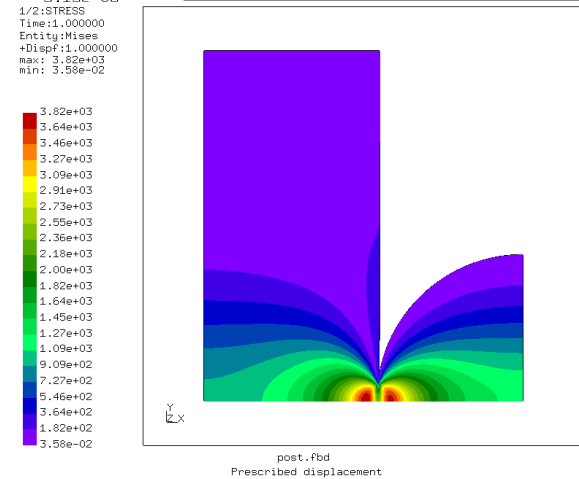
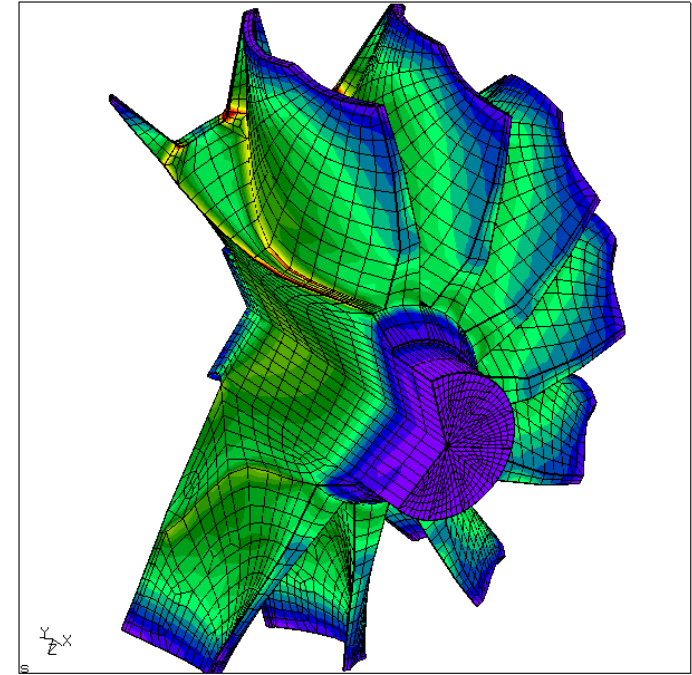
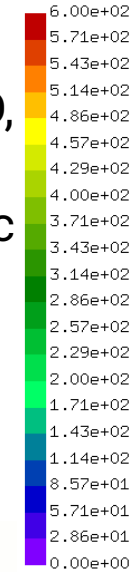
1: biri  
Loadcase 1: Time = 0.0000e+





FEM  
(implícito,  
explícito) CFD,  
Laplace-  
Helmholtz, etc

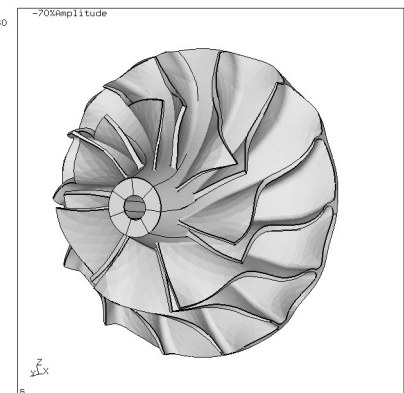
LC2:STRESS  
Tim:1.000000  
entity:Mises  
max: 8.62e+02  
min: 2.32e+00



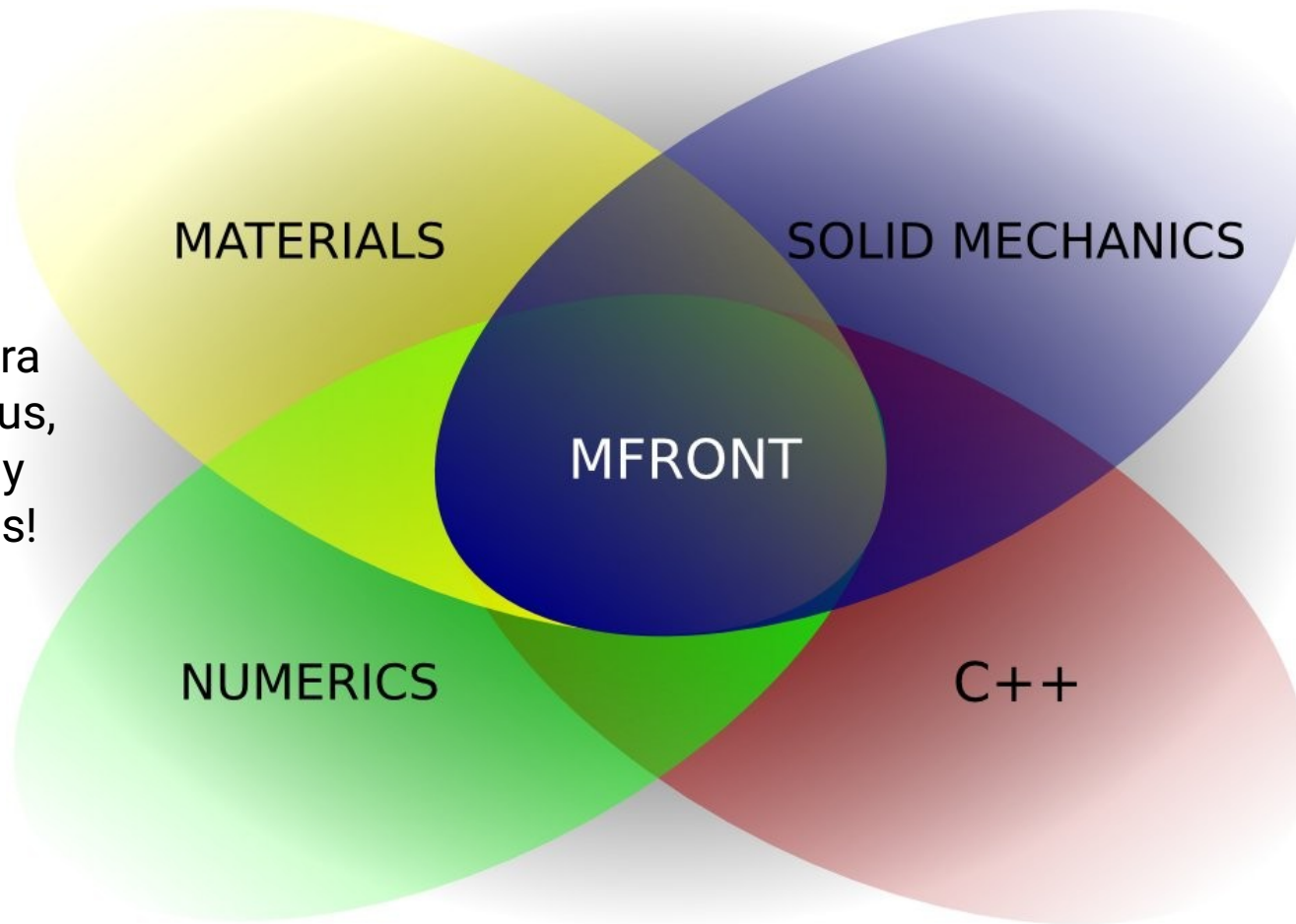
Alternativa directa a  
**ABAQUS**

Intenta ser  
compatible con su  
input y funcionalidad

latfmcyc.frd  
22/58:PDISP  
Time:34567.372380  
An:Initiated



¡Funciona para  
ANSYS, Abaqus,  
Code\_Aster y  
otros muchos!



**No hay equivalente comercial.**  
Permite definir de forma muy sencilla y eficiente  
propiedades y comportamientos de los materiales

```
@DSL MaterialLaw;
@Material U02;
@Law YoungModulus_Martin1989;
@Output E;
@Input T, f;
@PhysicalBounds T in [0:*]; // Temperature is positive
@PhysicalBounds f in [0:1.]; // Porosity is positive and lower than one
@Bounds T in [273.15:2610.15]; // Validity range
@Function {
  E = 2.2693e11 * (1 - 2.5 * f) * (1 - 6.786e-05 * T - 4.23e-08 * T * T);
}
```

## Propiedades de los materiales

```
@DSL IsotropicPlasticMisesFlow; //< domain specific language
@Behaviour Plasticity; //< name of the behaviour
@Parameter H = 22e9; //< hardening slope
@Parameter s0 = 200e6; //< elasticity limit
@FlowRule{ //< flow rule
  f = seq-H*p-s0;
  df_dseq = 1;
  df_dp = -H;
}
```

```
@Brick "StandardElastoViscoPlasticity" {
  // Here the stress potential is given by the Hooke Law. We define:
  // - the elastic properties (Young modulus and Poisson ratio).
  // Here the Young modulus is a function of the temperature.
  // The Poisson ratio is constant.
  // - the thermal expansion coefficient
  // - the reference temperature for the thermal expansion
  stress_potential : "Hooke" {
    young_modulus : "2.e5 - (1.e5*((T - 100.)/960.))**2)",
    poisson_ratio : 0.3,
    thermal_expansion : "1.e-5 + (1.e-5 * ((T - 100.)/960.) ** 4)",
    thermal_expansion_reference_temperature : 0
  },
  // Here we define only one viscoplastic flow defined by the Norton Law,
  // which is based:
  // - the von Mises stress criterion
  // - one isotropic hardening rule based on Voce formalism
  // - one kinematic hardening rule following the Armstrong-Frederick Law
  inelastic_flow : "Norton" {
    criterion : "Mises",
    isotropic_hardening : "Voce" {R0 : 200, Rinf : 100, b : 20},
    kinematic_hardening : "Armstrong-Frederick" {
      C : "1.e6 - 98500 * (T - 100) / 96",
      D : "5000 - 5 * (T - 100)"
    },
    K : "(4200. * (T + 20.) - 3. * (T + 20.0)**2)/4900.",
    n : "7. - (T - 100.) / 160.",
    Ksf : 3
  }
};
```

## Comportamientos mecánicos

[TFEL/MFront](#)

[MGIS](#)

Open  FOAM®

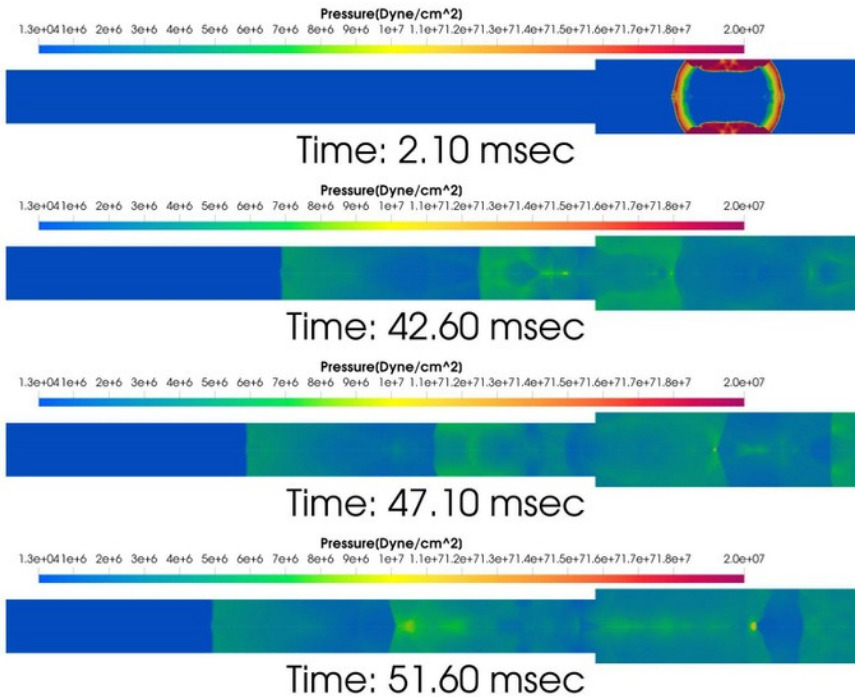


code\_saturne

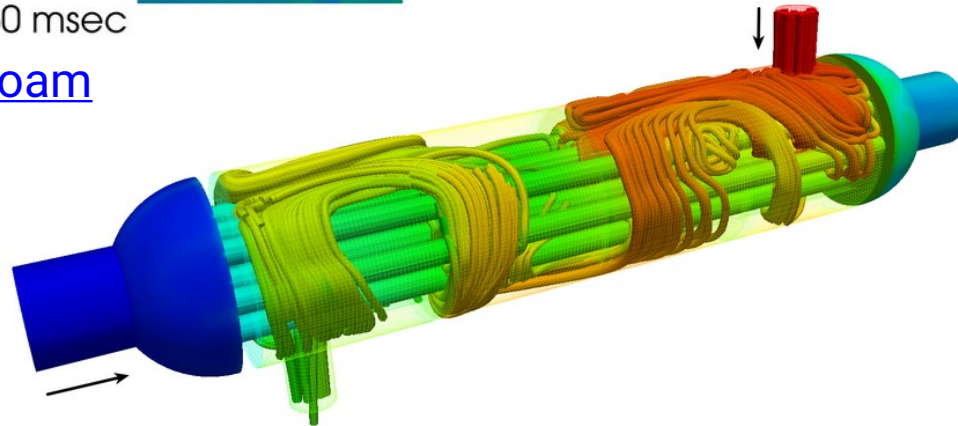
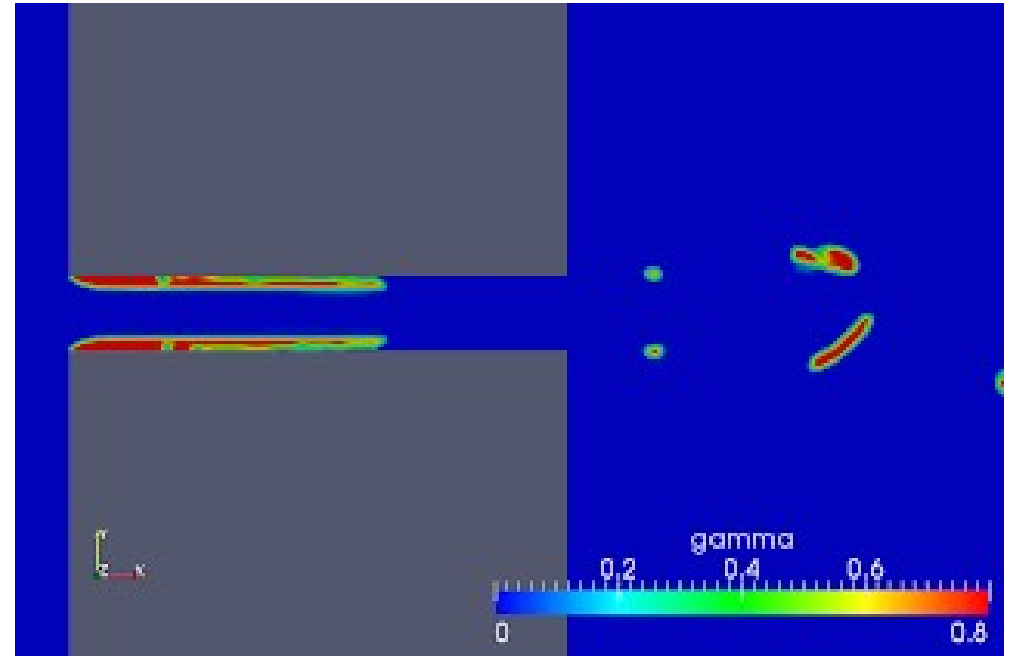


SU2  
code

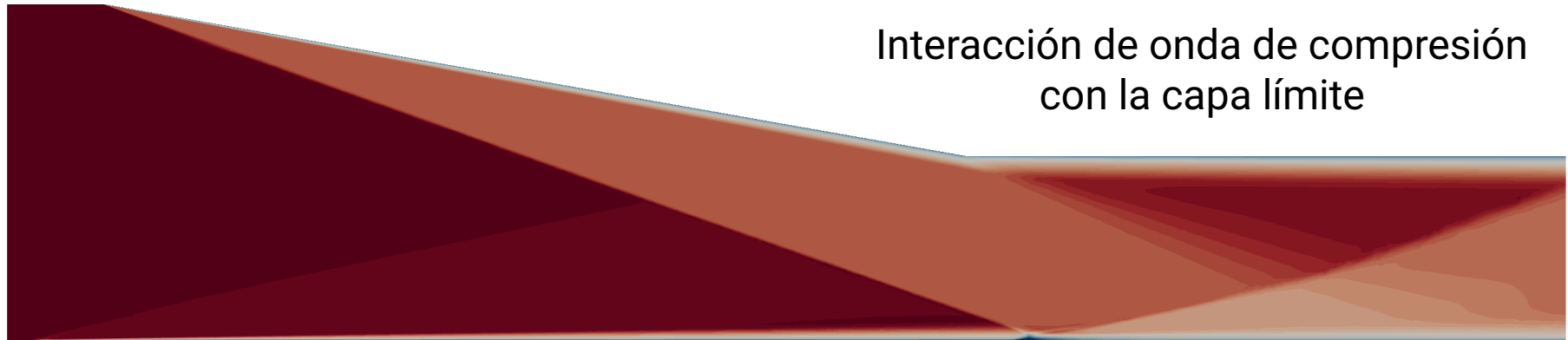




[blastFoam](#)

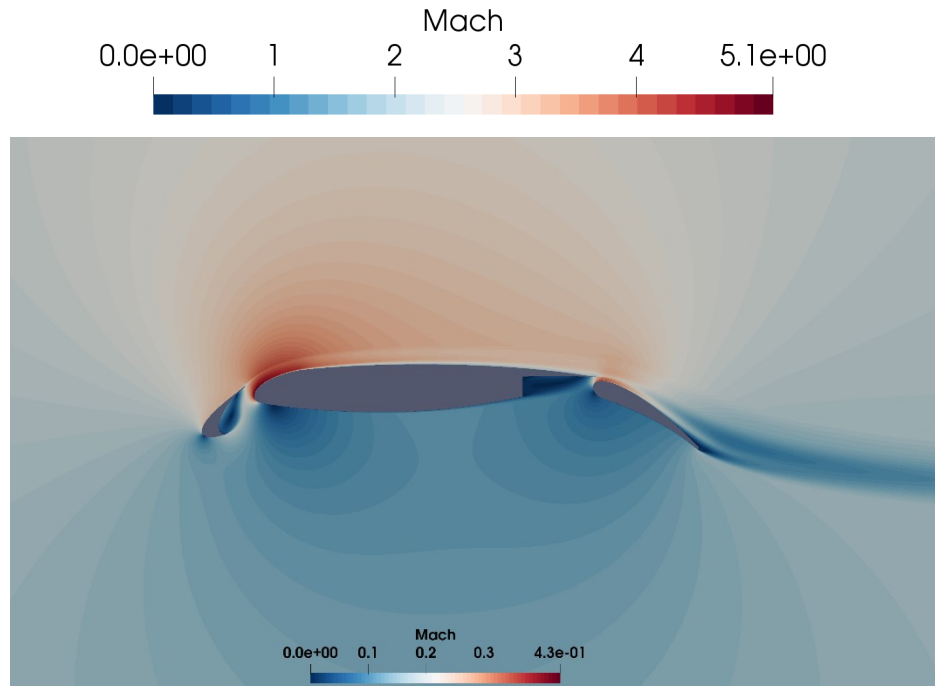


# Interacción de onda de compresión con la capa límite

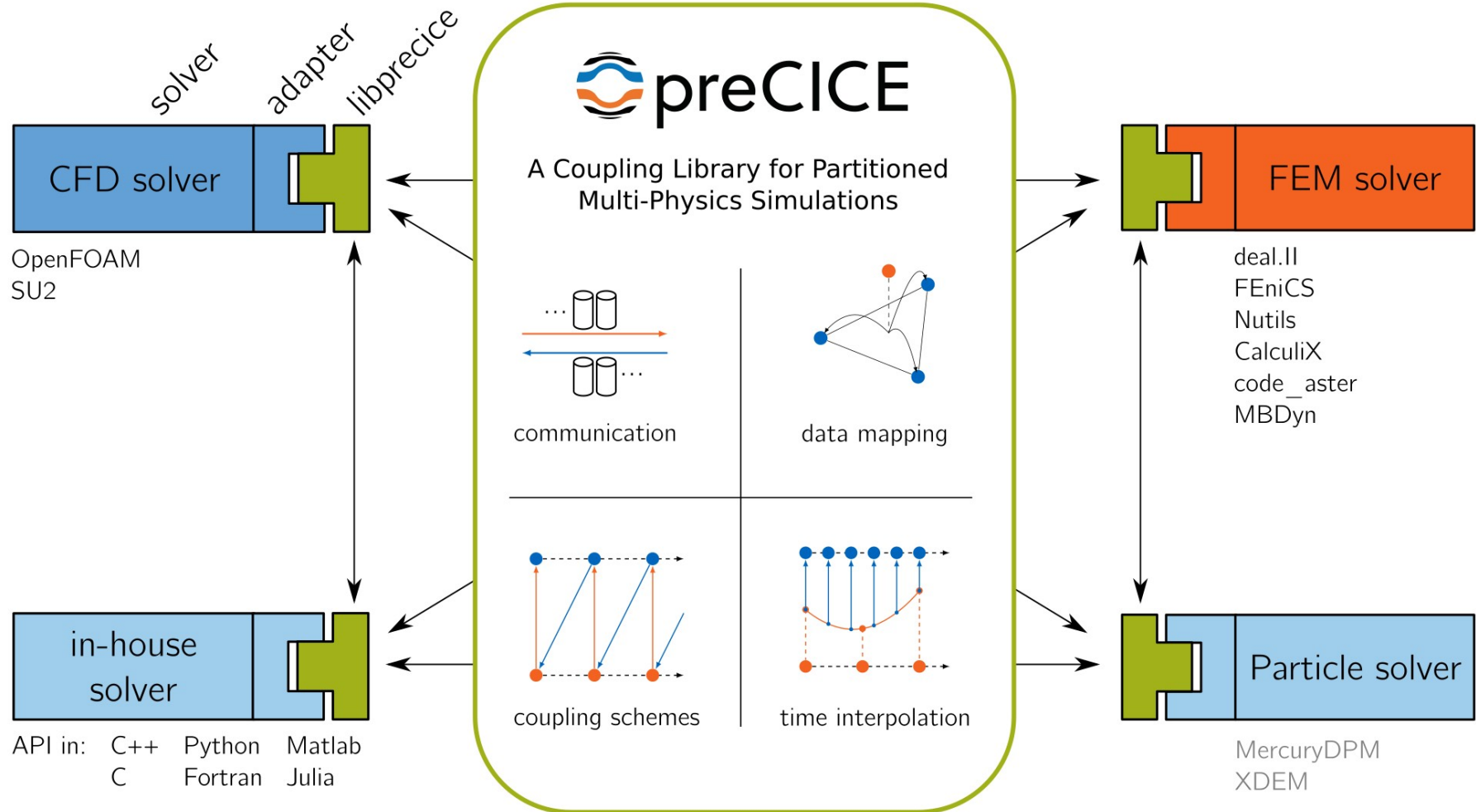


Modelos termoquímicos basados en [Mutation++](#)

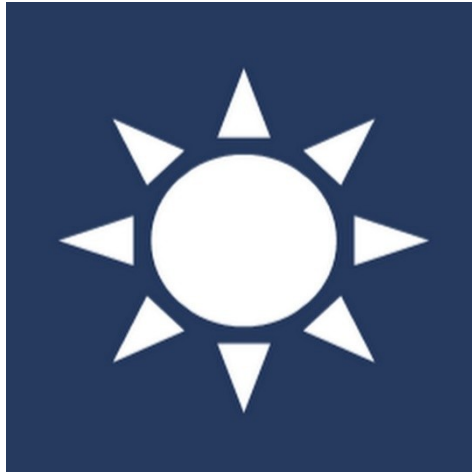
[SU2-NEMO](#)







**No hay equivalente propietario y probablemente nunca lo haya**



System Advisory Model ([SAM](#)),  
desarrollado por NREL

Análisis tecno-económico de  
tecnologías renovables.  
¡Muy potente!



[Open](#)  
[Sustainable](#)  
[Technology](#)



## OpenStudio

Cálculo energético de  
edificaciones: HVAC, radiación,  
controles, economía, etc.

Integra [Radiance](#) y [EnergyPlus](#)



[Ladybug](#) tools. Integra muchos  
sistemas en uno solo (CFD,  
OpenStudio, etc)



## LFENERGY Landscape

Selección de  
herramientas por  
tipo y objetivo. Muy  
útil





Develop geometry using one of the available tools.

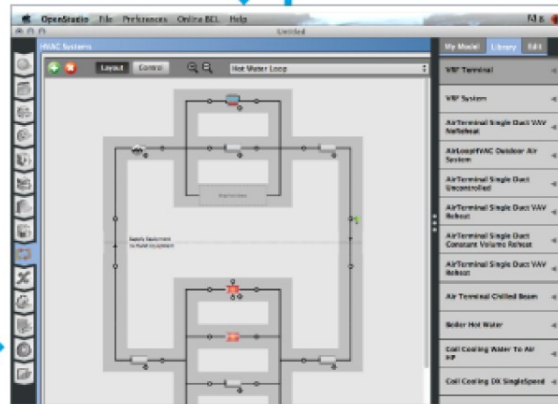
Envelope

Baseline

Additional Inputs



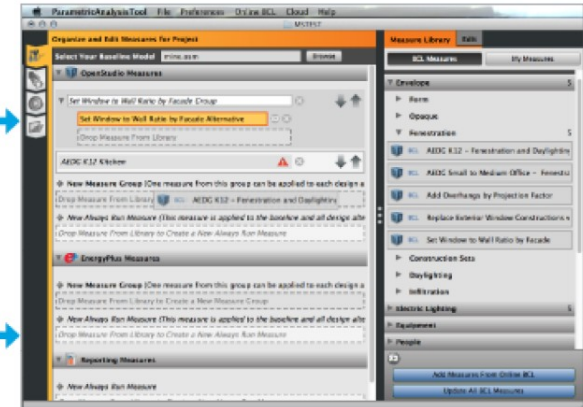
The **Building Component Library (BCL)** provides an online source for standardized model inputs and energy conservation measures.



Edit and create spaces, thermal zones, HVAC systems, schedules, loads, constructions, and more using the **OpenStudio Application**.

Measures

Energy conservation **measures**, reporting measures, and quality control measures are available in the OpenStudio application and in PAT.



**ParametricAnalysisTool (PAT)** enables drag-and-drop energy efficiency measures to alter the baseline model and create design alternatives.

| Design Alternative Name                                 | Energy Use Intensity (kBtu/ft2-yr) | Peak Electric Demand (kW) | Electricity Consumption (kBtu) | Natural Gas Consumption (kBtu) | District Cooling Consumption (kBtu) | District Heating Consumption (kBtu) |
|---|------------------------------------|---------------------------|--------------------------------|--------------------------------|-------------------------------------|-------------------------------------|
| Baseline  | 228                                | 23,754                    | 22,044                         | 0                              | 279                                 | 261                                 |
| Add Overhang by Projection Factor Alternative 0.5 Only  | 4 (-2%)                            | 0                         | 0                              | 0                              | -12 (-4%)                           | 15 (5%)                             |
| Add Overhang by Projection Factor Alternative 1.0 Only  | 4 (-2%)                            | 0                         | 0                              | 0                              | -12 (-4%)                           | 15 (5%)                             |
| Reduce Night Time Lighting Loads Alternative Only       | 5 (2%)                             | 5,654 (24%)               | 11,650 (53%)                   | 0                              | 24 (9%)                             | 110 (42%)                           |
| Reduce Building Lighting by Percentage Alternative Only | 7 (3%)                             | 3,427 (14%)               | 21,458 (97%)                   | 0                              | 22 (8%)                             | 206 (79%)                           |
| Use of Enveloping                                       | 18 (8%)                            | 5,932 (25%)               | 26,411 (120%)                  | 0                              | 281 (101%)                          | 210 (80%)                           |

**PAT** performs life cycle cost analysis of design alternatives, runs automated quality checks, and packages simulation results for upload to EDAPT.

# Software libre en la ingeniería eléctrica y electrónica

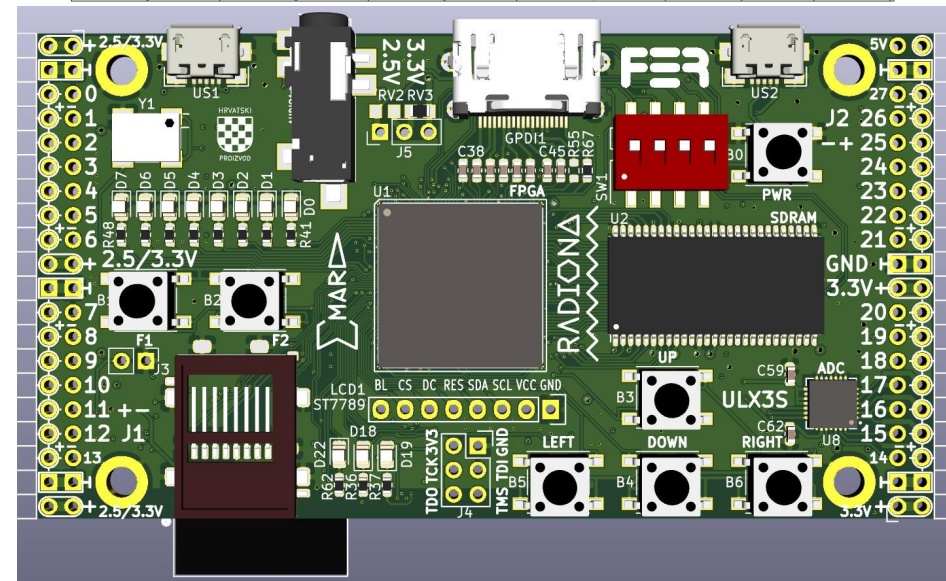
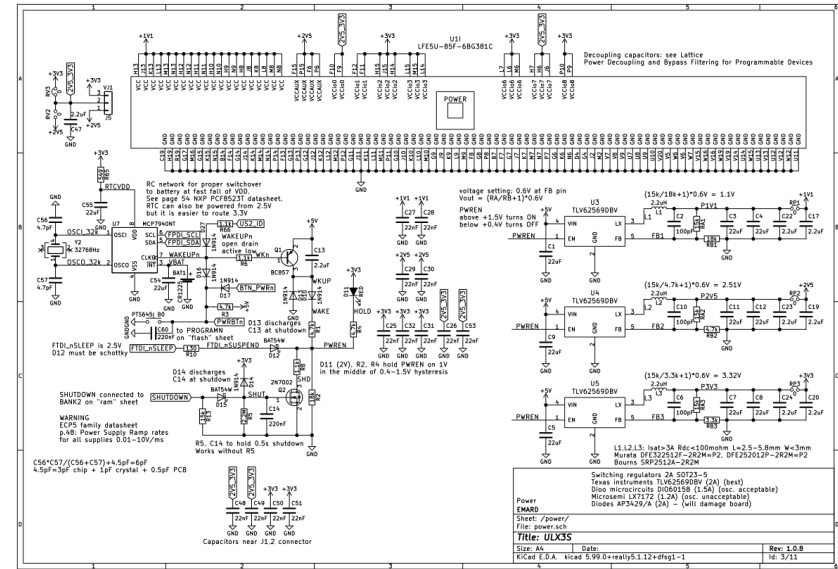


Alternativa a Altium Designer, Autodesk EAGLE, Proteus PCB...

Diseño esquemático y PCB. Trae muchas herramientas auxiliares

Su uso comercial ya es extremadamente común. CERN lo usa para el diseño de sus detectores

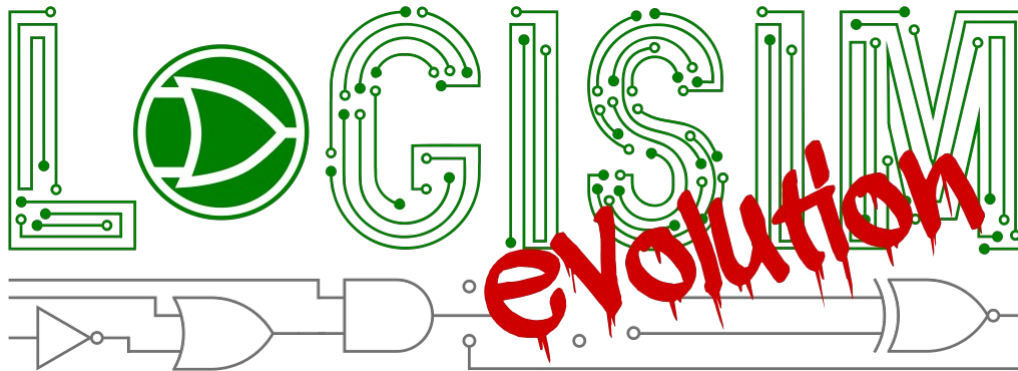
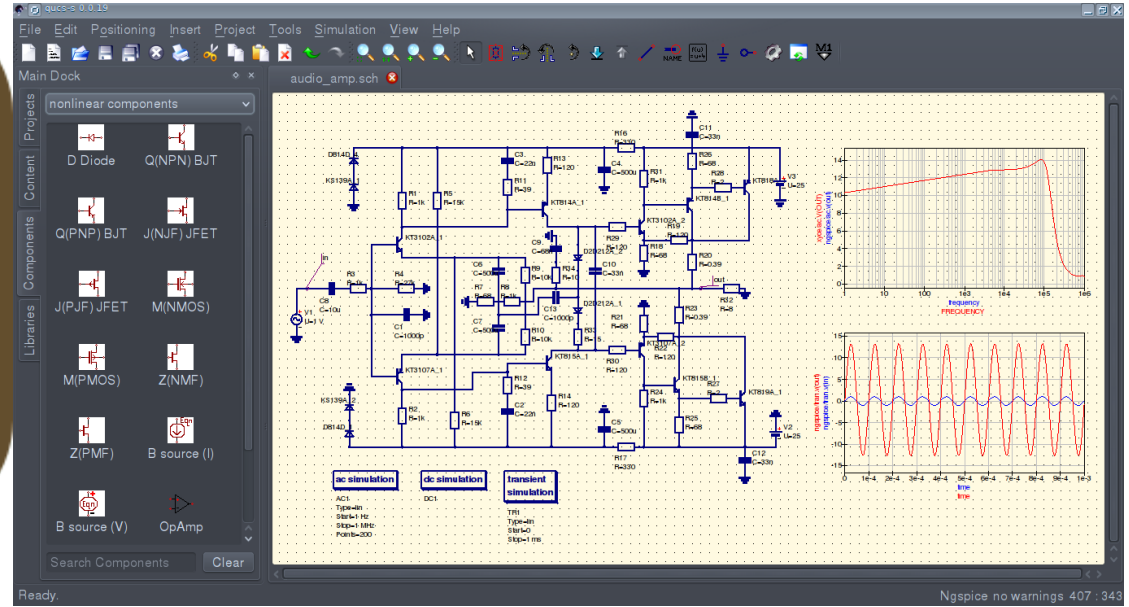
ULX3S: FPGA completamente libre



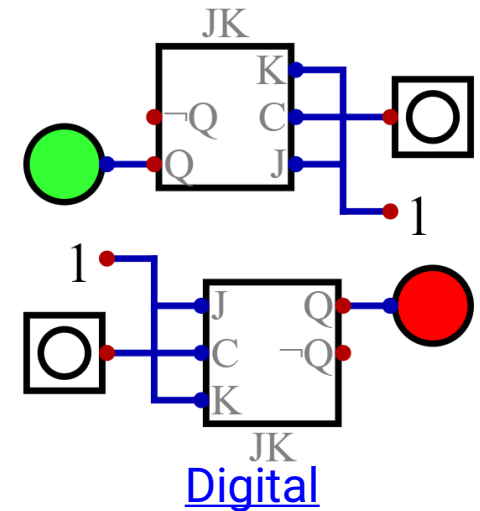


Alternativas a  
Altium,  
LTSpice

Simulación  
analógica



Simulación de  
circuitos  
digitales, lógica  
y CPUs





CNC para PCBs

## Simulación SPICE

- ▶ [Xyce](#) (HPC)
- ▶ [ngspice](#)

[OpenROAD](#) y  
[OpenLane](#)

PnR para diseños  
en silicio

[KLayout](#)  
Diseño de  
componentes y  
trazas de silicio

[IEEE SA Open](#)

```

# The KCell declaration for the circle
class StarKCell - KCellDeclarationHelper
include RMA

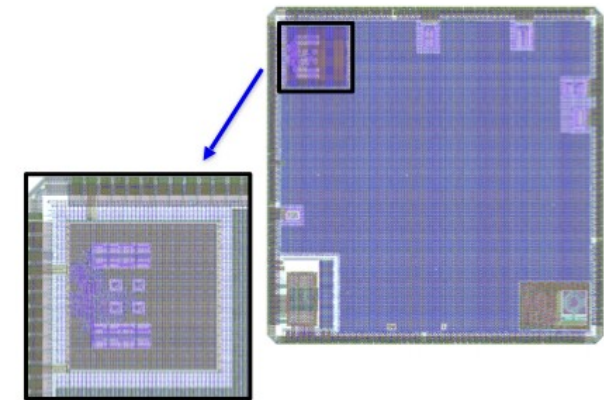
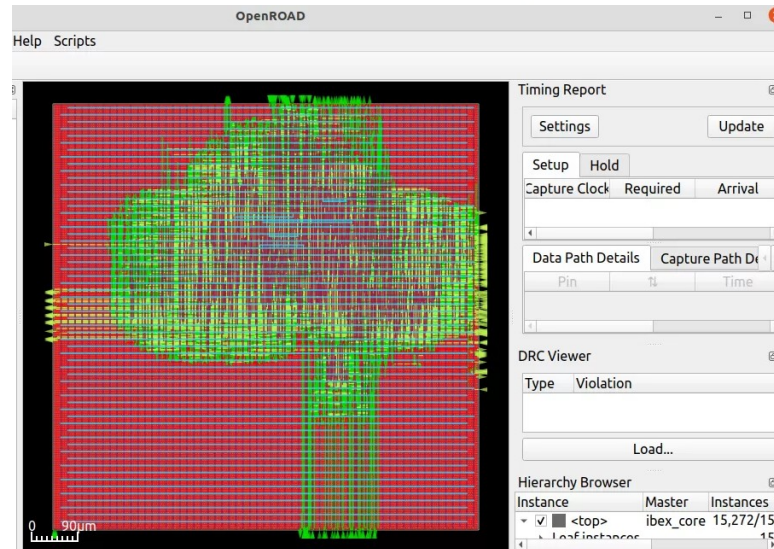
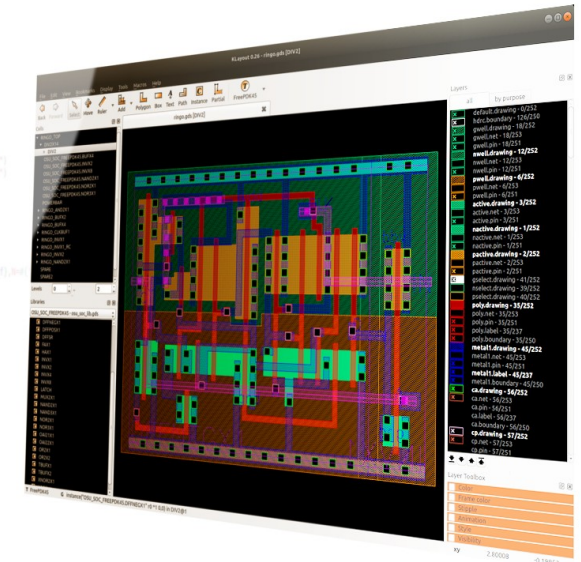
def initialize
  # Important: initialize the super class
  super

  # declare the parameters
  param(r1, TypeLayer, "Layer", :default => LayerInfo.new(1, 0))
  param(r1, TypeDouble, "Inner radius", :default => 1, :unit => "um")
  param(r2, TypeDouble, "Outer radius", :default => 3, :unit => "um")
  param(n, TypeInt, "Number of rays", :default => 30)
  param(da, TypeInt, "Ray angle", :default => 3, :unit => "deg")
end

def display_text_impl
  # Provide a descriptive text for the cell
  "StarKCell([1, to_s], R1=[1.31 * r1, to_f], R2=[1.31 * r2, to_f])"
end

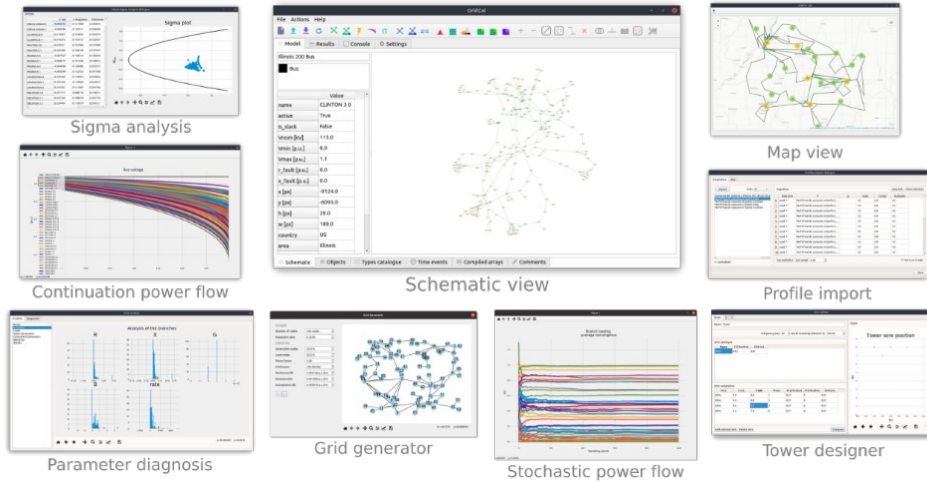
def produce_impl
  # This is the main part of the implementation: create the layout

  # compute the ray parts and produce the polygons
  d = Math::PI * da * 0.5 / 180.0
  a = 0.0
  n.times do |i|
    dpts = []
    DPoint.new(r1 * Math.cos(a + d), r1 * Math.sin(a + d)),
    DPoint.new(r1 * Math.cos(a - d), r1 * Math.sin(a - d)),
    DPoint.new(r2 * Math.cos(a + d), r2 * Math.sin(a + d)),
    DPoint.new(r2 * Math.cos(a - d), r2 * Math.sin(a - d))
  }
  cell.shapes(1, Layer).insert(DPolygon.new(dpts))
  a += Math::PI * 2 / n
end
end
    
```



OpenTitan SoC





[GridCal](#)

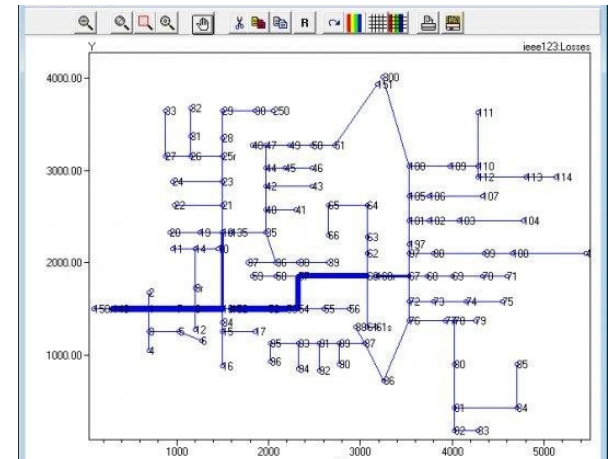
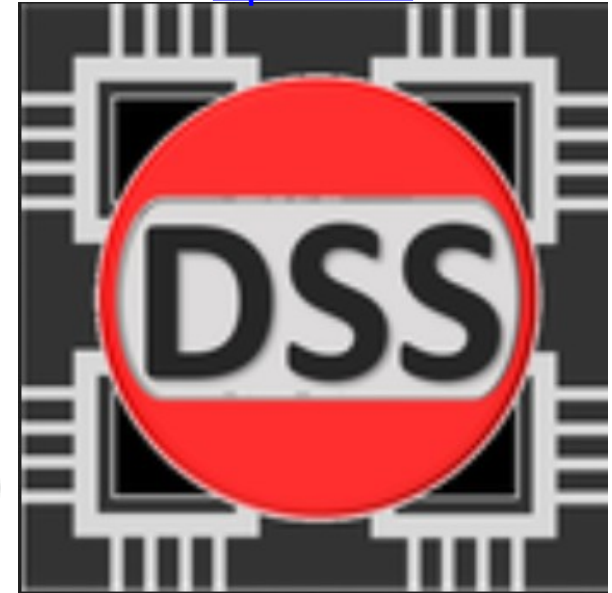
Alternativas a Siemens PSSE, ETAP, et al.



[Matpower](#)



[OpenDSS](#)



The screenshot displays the GNU Radio GUI interface. At the top, a menu bar includes File, Edit, View, Build, Tools, and Help. Below it is a toolbar with various icons for file operations and signal processing. The main workspace contains a flowchart with several blocks:

- WX GUI Chooser** (ID: ch) with a Default Value of 90 and a Type of Drop Down.
- Variable** (ID: freq) with a Value of 91.25M.
- WX GUI Slider** (ID: hsync) with a Default Value of 0, Minimum of -10, and Maximum of 10.
- WX GUI Slider** (ID: hdelay) with a Default Value of 50, Minimum of 0, and Maximum of 100.
- WX GUI Slider** (ID: vdelay) with a Default Value of 50, Minimum of 0, and Maximum of 100.
- Complex to Mag** block.
- Low Pass Filter** block with Decimation: 1, Sample Rate: 2M, Cutoff Freq: 80k, Transition Width: 80k, Window: Hamming, and Beta: 6.76.
- WX GUI Scope Sink** block with Title: Scope Plot, Sample Rate: 2M, and V Scale: 500m.

Two analysis windows are open:

- Scope Plot**: Shows a waveform with three channels (Ch1, Ch2, Ch3) over a time range of 180 to 320 microseconds. The Y-axis is labeled 'Counts' and ranges from -1.5 to 2.5. The X-axis is labeled 'Time (us)'. The plot shows a complex signal with a clear periodic component.
- Spectrogram**: Shows a frequency spectrum over time. The Y-axis is labeled 'Counts' and ranges from -1.5 to 2.5. The X-axis is labeled 'Time (us)'. The plot shows a complex signal with a clear periodic component.

At the bottom of the GUI, there are several control elements:

- SI Sampl Wave Freq Ampli Offse** block.
- hsync**: 300m
- hdelay**: 30
- vdelay**: 68
- ch**: 4ch

On the right side, there is a list of available blocks:

- [ Equalizers ]
- [ Error Coding ]
- [ Error Correction ]
- [ FCD ]
- [ FasTrak ]
- [ File Operators ]
- [ Filters ]
- [ Fourier Analysis ]
- [ GUI Widgets ]
- [ QT ]
- [ WX ]

At the bottom left, there is a status bar with the following text:

```

gnuradio v: 3.12.1-10-g3c02250 (6.1.2gk) gnuradio 3.7.4
built-in source types: file fcd rtl tcp uhd hackrf bladerf rfspace
Using device #0 Generic RTL2832U SN: 77771111153705700
Found Fitipower FC0013 tuner
Exact sample rate is: 2000000.052982 Hz
Using Volk machine: avx_64_mmx_orc
  
```

## GNU Radio

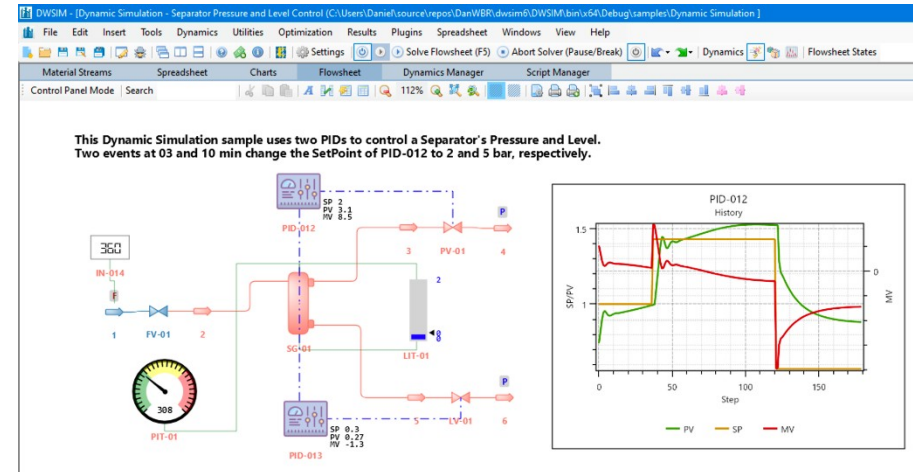
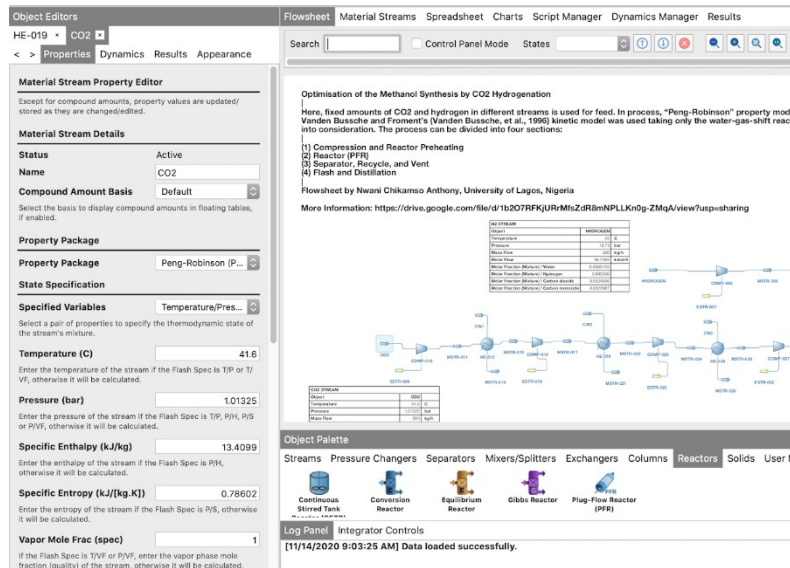
# Software libre en la ingeniería, otros campos



# DWSIM

Alternativa a CHEMCAD, Aspen Plus.

Modelos de fluidos reales, controles, barridos paramétricos, programación VB o Python...

Object Editors  
HE-019 • CO2

Material Stream Property Editor

Material Stream Details

Status: Active

Name: CO2

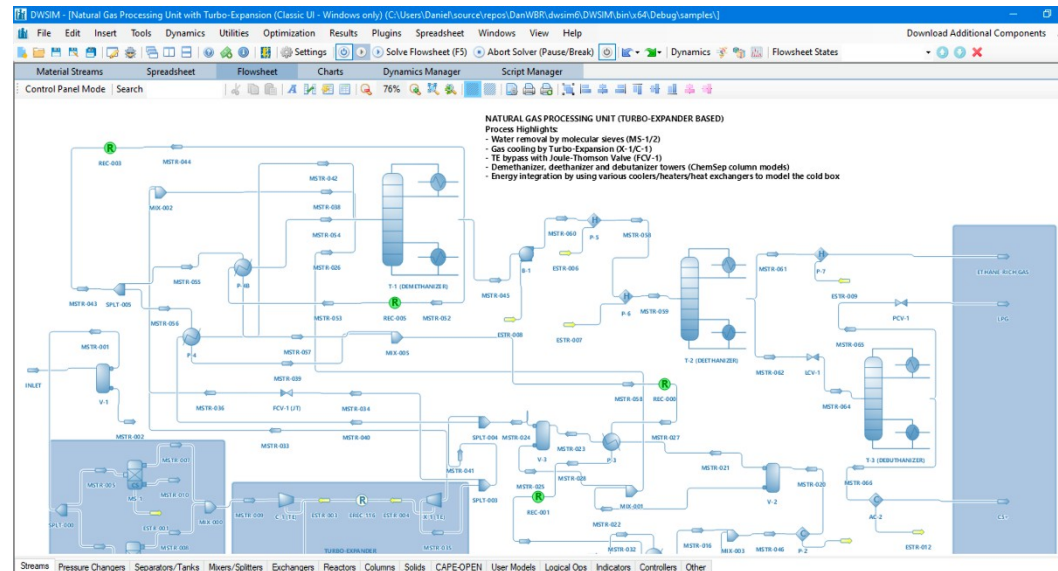
Compound Amount Basis: Default

Property Package: Peng-Robinson (P...)

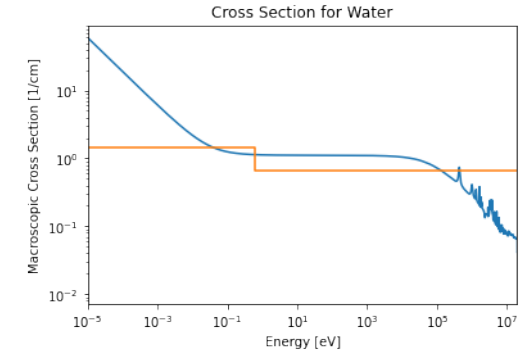
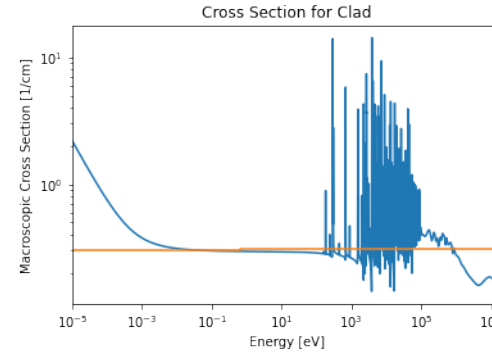
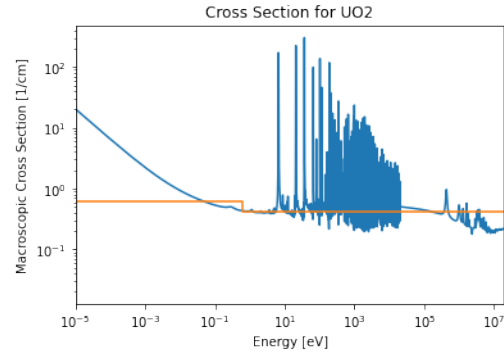
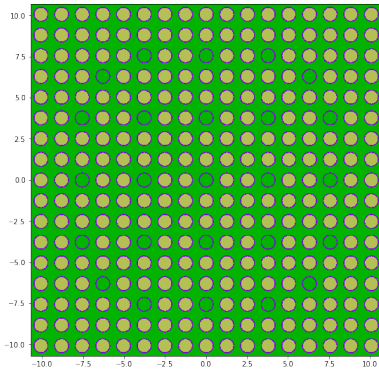
State Specification: Temperature/Pres...

Specified Variables: Temperature (C): 41.6, Pressure (bar): 1.01325, Specific Enthalpy (kJ/kg): 13.4099, Specific Entropy (kJ/kg.K): 0.78602, Vapor Mole Frac (spec): 1

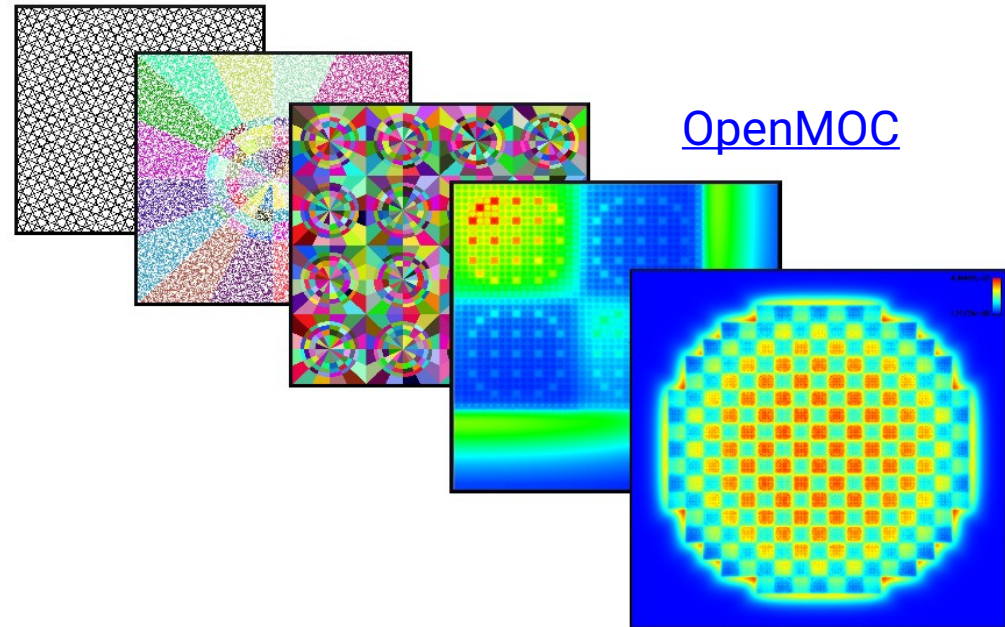
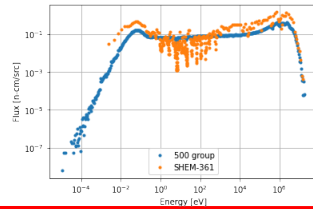
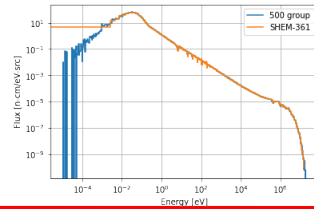
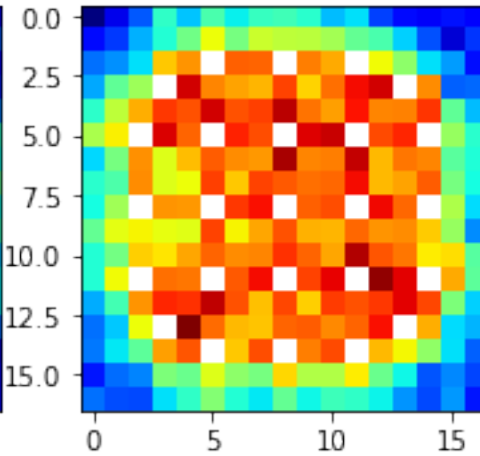
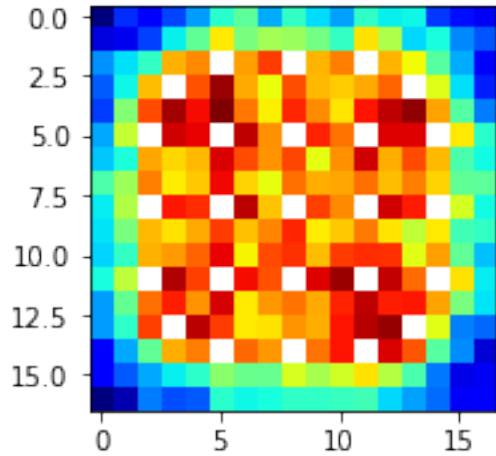
Log Panel: [11/14/2020 9:03:25 AM] Data loaded successfully.



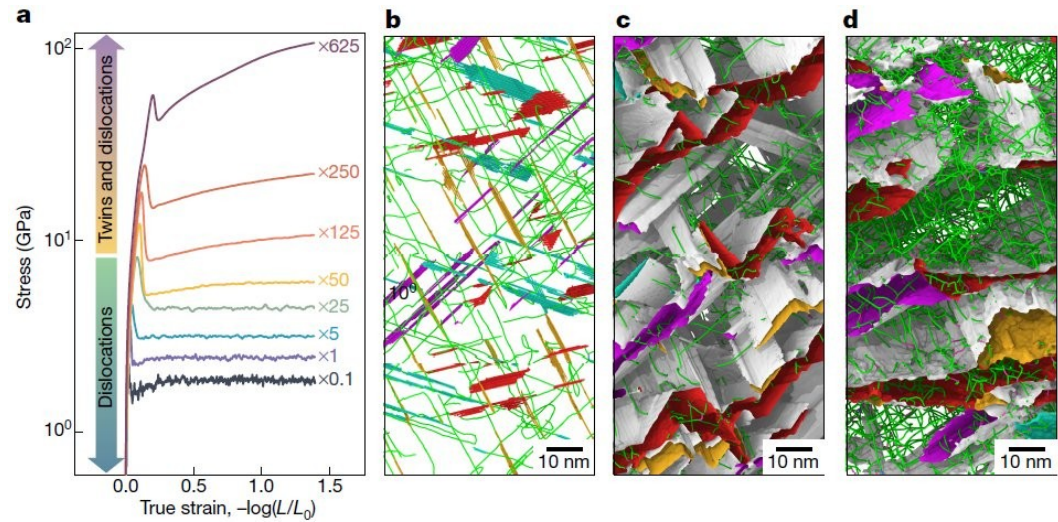
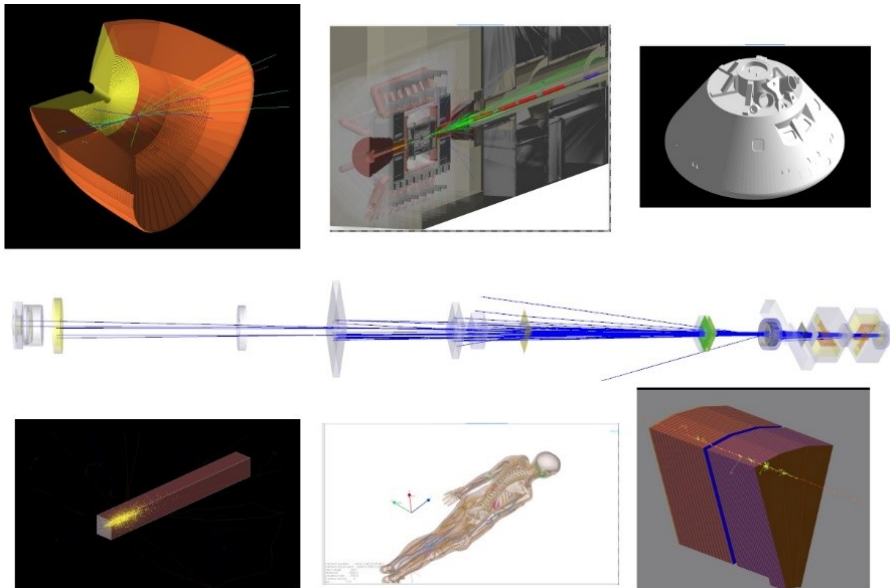
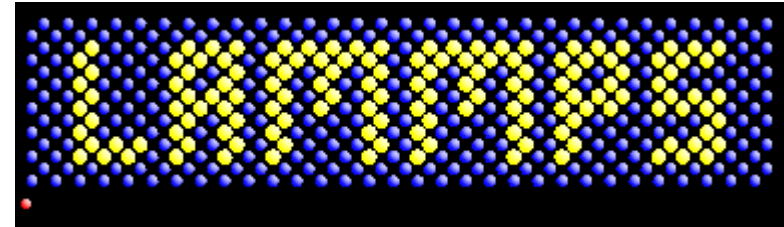
## OpenMC

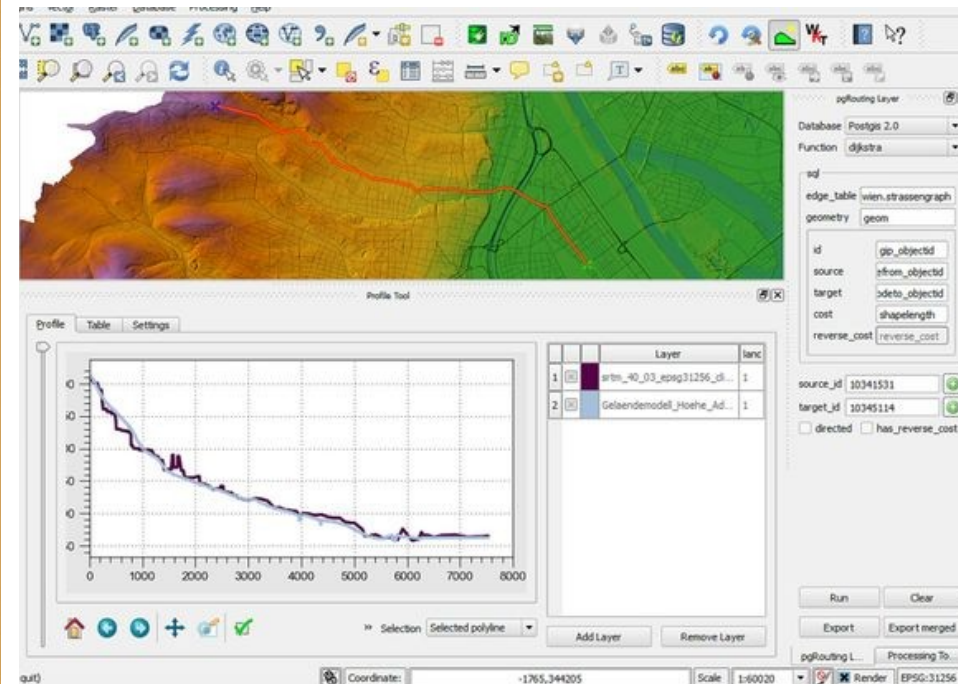
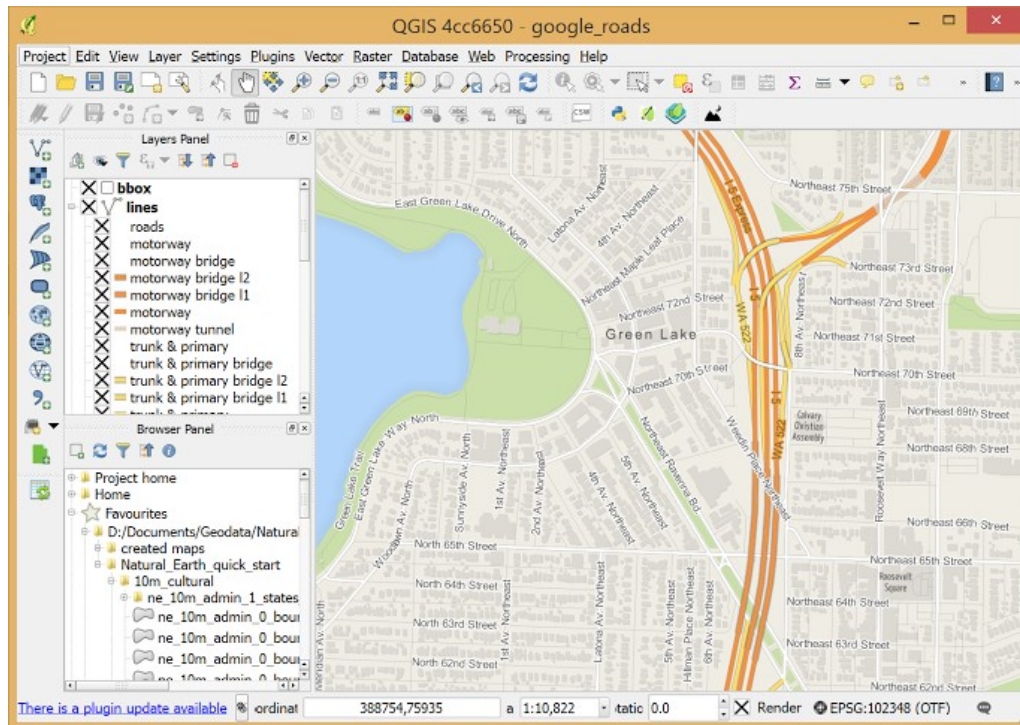


## Continuous-Energy Fission Rates Multi-Group Fission Rates



## OpenMOC









## ❑ Enterprise Resource Planning (ERPs)

- ▶ Tryton: presencia española/Europea
- ▶ Dolibarr: presencia Europea. Bastante conocido
- ▶ Odoo: no todo es abierto. Es seguramente el más conocido
- ▶ ERPNext: sistema moderno y de rápida evolución

## ❑ Organización de proyecto

- ▶ ProjeQtOr: herramienta muy completa y muy capaz: control de calidad, tickets, usuarios, Gantt, tiempos...
- ▶ Taiga: sistema moderno de organización (Agile, SCRUM...)
- ▶ FrePPLe: administración de sistemas de producción
- ▶ OpenProject: muy completo, pero no todo es abierto
- ▶ ProjectLibre: tradicional y sencillo

- Search
- Bookmarks
- My Dashboard**
- Setup
- Admin Tools
- Users & Groups

Add widget to your dashboard...

**GLOBAL VIEW**  
**93 late**  
75.61% late

**AGENDA**  
To do: **4**

**PROJECTS**  
Open: **10**   
Open tasks: **9**

**COMMERCIAL PROPOSALS**  
To accept | refuse: **22**   
To bill: **6**

**ORDERS**  
Open: **24**

**INVOICES**  
Unpaid: **13**

**CONTRACTS**  
Services to activate: **0**  
Services running: **1**

**VENDOR PROPOSALS**  
To accept | refuse: **0**  
To close: **0**

**PURCHASE ORDERS**  
Open: **1**   
Awaiting reception: **1**

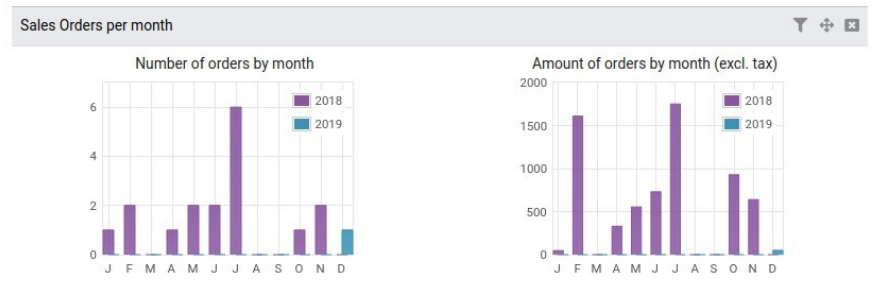
**VENDOR INVOICES**  
To pay: **7**

**BANK ACCOUNT**  
To reconcile: **23**   
Checks awaiting deposit: **5**

**MEMBERS**  
Subscription to receive: **2**

**EXPENSE REPORT**  
To pay: **1**

**LEAVE**  
To approve: **0**

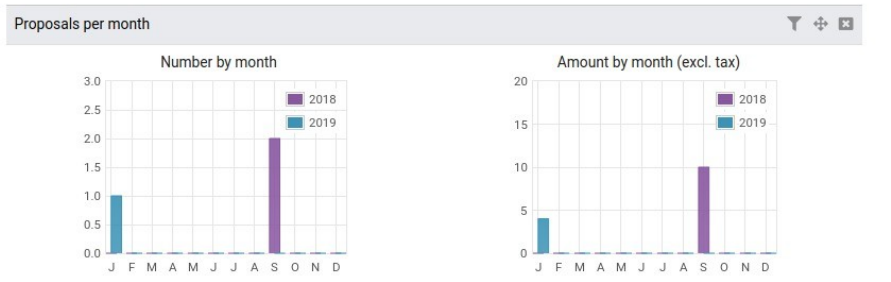


**Database Statistics**

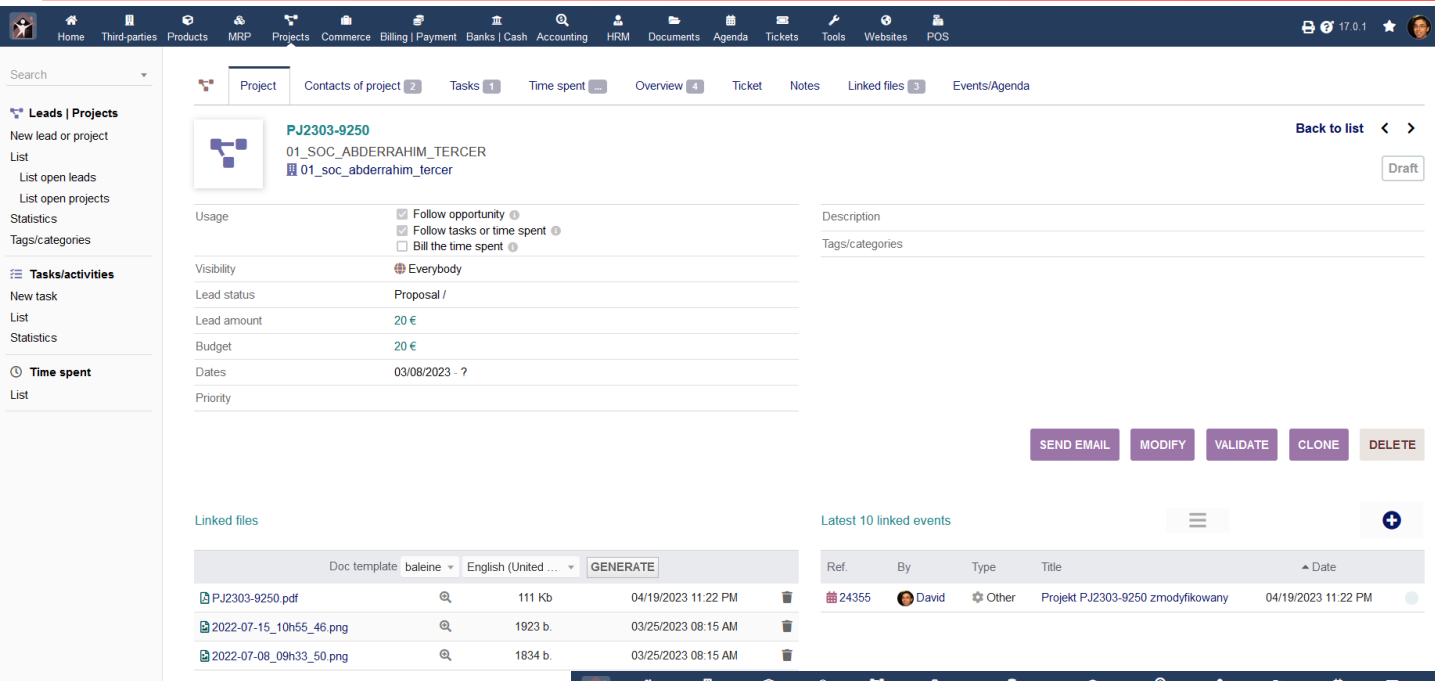
|                                |                        |                             |                                 |                                |
|--------------------------------|------------------------|-----------------------------|---------------------------------|--------------------------------|
| Users<br><b>11</b>             | Customers<br><b>15</b> | Prospects<br><b>8</b>       | Vendors<br><b>8</b>             | Contacts/Adres...<br><b>10</b> |
| Members<br><b>3</b>            | Products<br><b>15</b>  | Services<br><b>2</b>        | Commercial prop...<br><b>38</b> | Sales Orders<br><b>38</b>      |
| Customer invoices<br><b>39</b> | Contracts<br><b>4</b>  | Interventions<br><b>3</b>   | Purchase orders<br><b>6</b>     | Vendors invoices<br><b>10</b>  |
| Vendor proposal<br><b>3</b>    | Projects<br><b>13</b>  | Expense reports<br><b>2</b> | Leave<br><b>3</b>               | Donations<br><b>3</b>          |

**Curently open tasks**

|   |                     |
|---|---------------------|
| PROJ1 TK1007-0001 Analyze                           | -25% 02:30/10:00    |
| PROJ1 TK1007-0002 Specification                     | -15% 02:00/05:00    |
| PROJ1 TK1007-0003 Development                       | --/--/--            |
| PJ1607-0001 TK1607-0004 Project preparation phase A | -0.5% 21:00/200:00  |
| PJ1607-0001 TK1607-0005 Project preparation phase B | +1.27% 11:11/300:00 |



Latest 5 news from Dolibarr.org News



The screenshot shows the 'Project' management interface in Dolibarr II. The top navigation bar includes Home, Third-parties, Products, MRP, Projects, Commerce, Billing | Payment, Banks | Cash, Accounting, HRM, Documents, Agenda, Tickets, Tools, Websites, and POS. The main content area displays details for project 'PJ2303-9250'. It includes a 'Usage' section with checkboxes for 'Follow opportunity', 'Follow tasks or time spent', and 'Bill the time spent'. The 'Lead status' is 'Proposal /', 'Lead amount' is '20 €', and 'Budget' is '20 €'. Below this, there are buttons for 'SEND EMAIL', 'MODIFY', 'VALIDATE', 'CLONE', and 'DELETE'. A 'Linked files' table is visible at the bottom left of the screenshot.

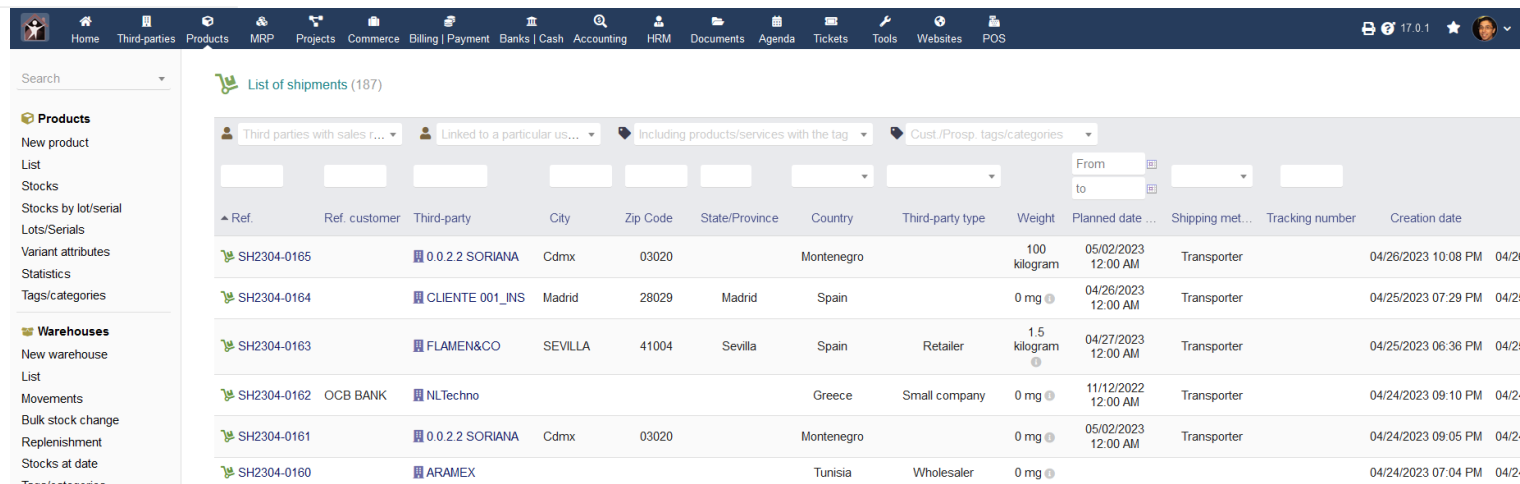
| Doc template            | baleine | English (United ...) | GENERATE |
|-------------------------|---------|----------------------|----------|
| PJ2303-9250.pdf         | 111 Kb  | 04/19/2023 11:22 PM  |          |
| 2022-07-15_10h55_46.png | 1923 b. | 03/25/2023 08:15 AM  |          |
| 2022-07-08_09h33_50.png | 1834 b. | 03/25/2023 08:15 AM  |          |

Administración de proyectos, costes, personas

¡Y muchos otros módulos!

Podéis usar la versión [Demo pública](#)

Productos, almacén, envíos, pedidos, suministradores, clientes...



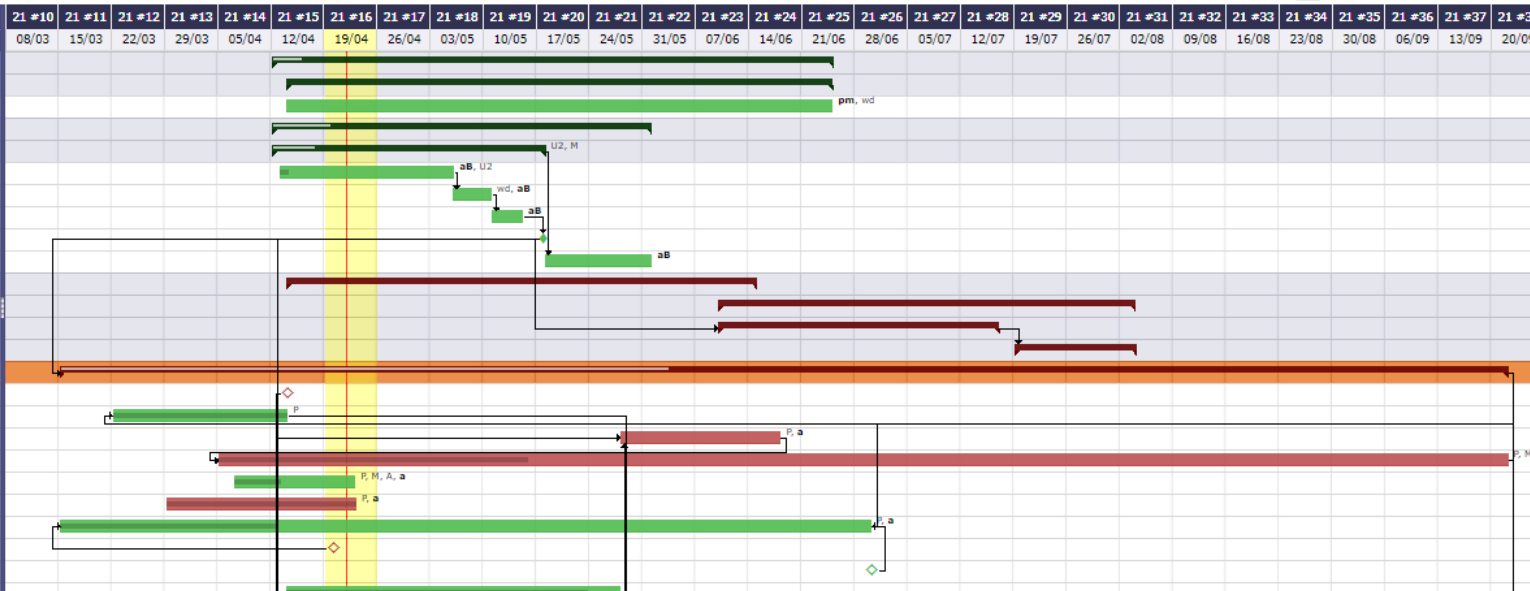
The screenshot shows the 'List of shipments' interface in Dolibarr II. The top navigation bar is the same as in the previous screenshot. The main content area displays a table of shipments with columns for Ref., Ref. customer, Third-party, City, Zip Code, State/Province, Country, Third-party type, Weight, Planned date, Shipping met..., Tracking number, and Creation date. The table contains several rows of shipment data.

| Ref.        | Ref. customer | Third-party     | City    | Zip Code | State/Province | Country    | Third-party type | Weight       | Planned date        | Shipping met... | Tracking number | Creation date       |
|-------------|---------------|-----------------|---------|----------|----------------|------------|------------------|--------------|---------------------|-----------------|-----------------|---------------------|
| SH2304-0165 |               | 0.0.2.2 SORIANA | Cdmx    | 03020    |                | Montenegro |                  | 100 kilogram | 05/02/2023 12:00 AM | Transporter     |                 | 04/26/2023 10:08 PM |
| SH2304-0164 |               | CLIENTE 001_INS | Madrid  | 28029    | Madrid         | Spain      |                  | 0 mg         | 04/26/2023 12:00 AM | Transporter     |                 | 04/25/2023 07:29 PM |
| SH2304-0163 |               | FLAMEN&CO       | SEVILLA | 41004    | Sevilla        | Spain      | Retailer         | 1.5 kilogram | 04/27/2023 12:00 AM | Transporter     |                 | 04/25/2023 06:36 PM |
| SH2304-0162 | OCB BANK      | NLTechno        |         |          |                | Greece     | Small company    | 0 mg         | 11/12/2022 12:00 AM | Transporter     |                 | 04/24/2023 09:10 PM |
| SH2304-0161 |               | 0.0.2.2 SORIANA | Cdmx    | 03020    |                | Montenegro |                  | 0 mg         | 05/02/2023 12:00 AM | Transporter     |                 | 04/24/2023 09:05 PM |
| SH2304-0160 |               | ARAMEX          |         |          |                | Tunisia    | Wholesaler       | 0 mg         |                     |                 |                 | 04/24/2023 07:04 PM |

Project: All projects | ProjeQtOr | v9.0.6 | admin

1 | Projects | Activities | Milestones | Meetings | **Planning** | Resources | Reports | Absences | Timesheet | Tickets

Scale: day | week | month | quarter | automatic run plan



**Project #10 - formation1** | en cours | 14/04/2021 | 13/04/2021

**Description**

id = 10  
 name: formation1  
 type: Manual billed  
 organization:

**Allocations to projects**

| +     | id | resource | profile        | start date | end date | rate (%) |
|-------|----|----------|----------------|------------|----------|----------|
| ✎ ✖ ✕ | 37 | ADAM     | Project Member |            |          | 100      |
| ✎ ✖ ✕ | 38 | MARTINE  | Project Member |            |          | 100      |
| ✎ ✖ ✕ | 36 | PAUL     | Project Leader |            |          | 100      |
| ✎ ✖ ✕ | 39 | POOL DEV | Project Leader |            |          | 100      |
| +     | id | contact  | profile        | start date | end date | rate (%) |

**Progress**

Dates and durations

|            | validated  | planned    | real       | requested  |
|------------|------------|------------|------------|------------|
| start date | 06/04/2021 | 15/03/2021 | 15/03/2021 | 04/01/2021 |
| end date   | 09/08/2021 | 21/09/2021 |            | 30/03/2021 |
| duration   | 87 d       | 133 d      |            | 62 d       |

¡Hay una versión [Demo](#) pública!

Project : All projects | ProjeQtOR | v9.0.6 | admin

1 | Projects | Activities | Milestones | Meetings | Planning | Resources | Reports | Absences | Timesheet | Tickets

### 11 Projects

| id | wbs | project name              | type          | color | project code | client     | status     | health status | progress | validated end date | planned end | done                     | closed                   |
|----|-----|---------------------------|---------------|-------|--------------|------------|------------|---------------|----------|--------------------|-------------|--------------------------|--------------------------|
| 6  | 1   | Absences                  | Administratif |       |              | internal   | en cours   |               | 100 %    | 23/04/2021         |             | <input type="checkbox"/> | <input type="checkbox"/> |
| 1  | 2   | project one               | Forfait       |       | 001-001      | client one | en cours   | surveillé     | 5 %      | 24/06/2021         | 24/06/2021  | <input type="checkbox"/> | <input type="checkbox"/> |
| 2  | 2.1 | project one - maintenance | Manual billed |       | 001-001-1    | client one | enregistré | sécurisé      | 0 %      | 24/06/2021         | 24/06/2021  | <input type="checkbox"/> | <input type="checkbox"/> |
| 3  | 2.2 | project one - development | Manual billed |       | 001-001-2    | client one | en cours   | en danger     | 15 %     | 01/06/2021         | 31/05/2021  | <input type="checkbox"/> | <input type="checkbox"/> |

---

### Project #2 - project one - maintenance

enregistré | 13/04/2021 | 06/12/2018 | E

#### Description

id = 2

name:

type:

organization:

category:

client:

invoice contact:

project code:

contract code:

client code:

is sub-project of:

sponsor:

manager:

color:

description:

#### Allocations to projects

| +                        | id | resource  | profile        | start date | end date | rate (%) |
|--------------------------|----|-----------|----------------|------------|----------|----------|
| <input type="checkbox"/> | 4  | analyst A | Project Member |            |          | 100      |

*Allocate contacts (requestors) that are not resources  
These contacts can also be users (that will connect)*

| +   | id | contact | profile | start date | end date | rate (%) |
|---|----|---------|---------|------------|----------|----------|
| <i>Allocate users that are not resources not contacts</i> |    |         |         |            |          |          |

#### Treatment

status:

health status:

quality level:

trend:

overall progress:

fix planning:  do not include in planning calculation

non extendable project:  forbid to add or remove items in planning

under construction:  the project is not started yet

exclude from global plan:  do not see all items on the global planning view

#### Progress

##### Dates and durations

|            | validated  | planned    | real | requested  |
|------------|------------|------------|------|------------|
| start date | 14/04/2021 | 14/04/2021 |      | 05/03/2012 |
| end date   | 24/06/2021 | 24/06/2021 |      | 13/11/2015 |
| duration   | 50 d       | 50 d       |      | 950 d      |

##### Costs and works

|            | validated | assigned | real | left     | revised |
|------------|-----------|----------|------|----------|---------|
| work       | 100 d     | 85,2 d   | 0 d  | 85,2 d   | 85,     |
| cost       | €         | 21 544 € | 0 €  | 21 544 € | 21 544  |
| expense    | €         | 0 €      | 0 €  | 0 €      | €       |
| reserve    |           |          |      | 0 €      |         |
| total cost | 0 €       | 21 544 € | 0 €  | 21 544 € | 21 544  |

##### Steering

progress:  expected:  wbs:

Margin:   € %

priority:

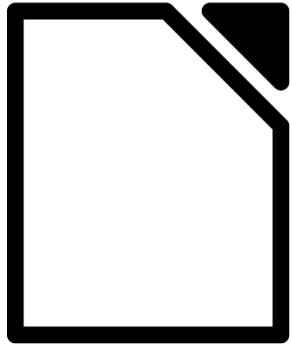
¡Hay una versión [Demo pública!](#)

- ❑ Editores: [VSCodium](#), [Emacs](#), [NeoVim](#), [QtCreator](#)...
- ❑ Organización (alternativas a Notion): [Logseq](#), [Appflowy](#)
- ❑ Escritura: [CryptPad](#), [Standard Notes](#), [Notesnook](#), [Trilium](#)
- ❑ **AI, análisis de datos:** [TensorFlow](#); [Redash](#), [Superset](#)...

---

- ❑ Control de cambios: [Git](#) ([Gitea](#), [Gitlab](#), [SourceHut](#)), [Fossil](#)
- ❑ Backend-Páginas web: [Supabase](#), [Appwrite](#), [PocketBase](#), [Hugo](#), [WordPress](#)...
- ❑ Bases de datos: [SQLite](#), [PostgreSQL](#), [MariaDB](#), [FerretDB](#), [CouchDB](#), [Redis](#), [ArangoDB](#), [InfluxDB](#), [TDengine](#), [Milvus](#)...
- ❑ Infraestructura: [Cockpit](#) (VMs), [Podman](#) (contenedores), [Kubertenes-K3S](#) (servicios), [CNCF!](#) (resumen de todo!)...
- ❑ Monitorización, métricas: [Prometheus](#), [Grafana](#)

# Y un extra, software libre para uso diario y hobbies



¡Alternativas a  
Microsoft Office!

# LibreOffice

The Document Foundation



ONLYOFFICE



Alternativa a  
InDesign

Revistas, pósters,  
panfletos

Scribus

# LATEX

Documentos de altísima  
calidad



**Figure 281: Context menu in Formula Editor**

**Note**

The Elements window and the context menu contain only the most common commands that are used in formulas. For some seldom-used commands, you must always enter the command using the markup language. For a complete list of commands, see the *Math Guide*.

**Markup language**

Markup language is entered directly into the Formula Editor. For example, typing the markup `5 times 4` into the Formula Editor creates the simple formula  $5 \times 4$ . If you are experienced in using markup language, it can be the quickest way to enter a formula. Table 5 shows some examples of using markup language to enter commands. For a full list of commands that can be used in the Formula Editor, see the *Math Guide*.

*Table 5: Example commands using markup language*

| Display        | Command                  | Display     | Command                |
|----------------|--------------------------|-------------|------------------------|
| $a = b$        | <code>a = b</code>       | $\sqrt{a}$  | <code>sqr t {a}</code> |
| $a^2$          | <code>a^2</code>         | $a_n$       | <code>a_n</code>       |
| $\int f(x) dx$ | <code>int f(x) dx</code> | $\sum a_n$  | <code>sum a_n</code>   |
| $a \leq b$     | <code>a &lt;= b</code>   | $\infty$    | <code>infinity</code>  |
| $a \times b$   | <code>a times b</code>   | $x \cdot y$ | <code>x cdot y</code>  |

276 | Creating formulas

Scribus 1.5.4.svn - [mnt://mnt/.../Mandats/Internes/Journal inter-prisons/Journal Oxygène/N°9 - La Famille/numéro 9 famille v2 - Serge [Scribus1.5].sla\*]

Fichier Édition Objet Insérer Page Tableau Extra Affichage Fenêtres Scripter Aide

Normal

Propriétés

X, Y, Z

Ombre Portée

Forme

Groupes

Image

Numéro de page: Automatique

X: 0,000 mm

Y: -15,000 mm

Rotation: 0,0 °

Mise à l'échelle

Mise à l'échelle libre

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24 Juin 2017

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Utilisation de Ghostscript version 9.18

Fonctions de police

Propriétés du tracé de texte

Fermer

ÉDITORIAL

## LA FAMILLE

**N**ous avons tous une famille, grande, petite, éloignée, rapprochée, élargie, inconnue... La famille est la cellule de la société. C'est grâce au lien familial que nous sommes ce que nous sommes, que l'homme a pu se développer, se protéger, des bêtes sauvages, aller à la chasse ensemble, élever les enfants... Voilà quelques tâches que l'homme a pu faire parce que des liens familiaux, claniques se sont établis.

Dans les prisons, les thèmes de la famille provoquent beaucoup d'émotions, parfois très fortes, mais aussi, hélas, une tristesse profonde due aux absences ou à l'éloignement. S'il est vrai que nous ne choisissons pas notre famille, il est aussi vrai que les liens sont très forts et qu'en général nous nous accompagnons toute la vie. La mère, le père, les frères et sœurs sont des personnes très importantes, sans oublier les oncles et tantes, cousins, cousines, grands-parents, à qui font de la famille un refuge, un lieu privilégié et l'essentiel bien.

La famille plus étroite nous évoque très souvent des souvenirs d'enfance de l'époque où nous étions « tous ensemble » et l'imaginer même pas qu'un jour nous allions être séparés. Les anecdotes, les histoires ne manquent pas. Des soirées autour du feu, de grandes fêtes autour d'une table etc... nous laissent des souvenirs indélébiles que nous portons dans notre cœur pendant longtemps.

Nous pouvons former des groupes « non traditionnels » suite à des voyages, des mariages, des adoptions... qui vont s'ajouter voire remplacer la famille naturelle. Par exemple, des groupes d'amis deviennent au fur et à mesure du temps passé ensemble comme une nouvelle famille, peut-être avec d'autres lois et d'autres habitudes mais quel bien ça fait de savoir que l'on n'est pas tout à fait seul!


Tous les groupes sont différents et peuvent créer des règles qui sont plus ou moins claires, il est important pour nous d'accepter de comprendre ces dynamiques pour pouvoir faire partie de ces nouvelles familles.

Tout le monde peut connaître un changement soudain dans sa vie et se retrouver tout à coup sans famille. La reconstruire, c'est un vrai art, qui demande beaucoup de talent et de persévérance. Être humain est socialement à besoin de contacts pour pouvoir vivre. La solitude, l'isolement et la perte d'interaction avec ses proches sont considérés comme des obstacles à surmonter sur le chemin vers le bonheur et l'épanouissement souhaités par tout être humain.

Dans le présent numéro, vous retrouverez sur le thème de la famille un entretien avec une détenue ayant un projet de maintien des liens entre parents et enfants, des textes et des dessins de détenus, ainsi que les contenus de ateliers d'écriture des prisons d'Itra, de Marnette et de Nivelles. La nouvelle rubrique « Focus » présente quant à elle l'ash « Relais enfant-parent » et nos sections « Jeux et Recits » complètent le tout.

↳ CARLO S. GOODY VIDAL

**BON A SAVOIR**



## JOURNÉES NATIONALES DE LA PRISON 2016

Depuis trois ans, les Journées Nationales de la Prison s'organisent en Belgique. Cet événement est une idée venue de France, à la base la Fédération des associations réflexion-action, prison et justice (FARAPE). L'organisation depuis 2002.

**P**our l'année 2016, l'ADEFP et d'autres associations qui travaillent dans le milieu carcéral (APRES, CAAP, Groupe INTR) et la Ligue des droits de l'Homme (LDH) ont organisé une exposition de travaux réalisés par des détenus de groupes d'étudiants du secondaire. Avec eux, des travailleurs de la LDH et la CAAP, entre autres, ont proposé des ateliers pour présenter la situation des détenus dans les prisons. La participation de jeunes a été très active et les réflexions très intéressantes sur des sujets qui ne sont pas très connus. La CAAP a présenté d'abord, pour introduire les animations, un exposé de témoignages de détenus.

Ils ont présenté leurs parcours et les difficultés éprouvées pendant et après leur incarcération. Suite à cela, les groupes d'étudiants ont eu la possibilité de participer à deux animations. Celle de la CAAP consistait à jouer un jeu de rôle et de se présenter à l'entrée d'un établissement pénitentiaire. Les autres ont pu connaître les contraintes du système carcéral. D'autre part, la LDH a organisé un débat à partir des questions générées. Les étudiants devaient diviser en deux groupes, les « pour » et les « contre ». Ensuite, la LDH a présenté le rapport qu'elle a publié sur les conditions de travail des personnes incarcérées dans notre pays. Pour débattre, nous avons eu la participation de Mme Mélanie Bertrand pour la CAAP, de M. Jean-Luc Bolmal de la Direction Générale des Établissements Pénitentiaires, de M. Mohamed Berchaï, délégué syndical de la CSC services publics de la prison de Forest et de Damien Scaillet de la LDH et de ULE.

Les trois journées ont été un événement collectif, nous pensons déjà à la préparation des prochaines. N'hésitez pas à nous envoyer vos textes, dessins et autres collaborations pour enrichir les prochaines journées et surtout pour essayer de faire entendre votre voix en dehors des murs.

↳ OSCAR CORTES

**SOMMAIRE**

- 3 = BON A SAVOIR
- 3 = N°9 2016
- 6 = Le cours de citoyenneté
- 6 = C'EST À VOUS
- 6 = Vos textes, dessins et poésies
- 32 = FOCUS
- 32 = Les relais enfant-parent
- 33 = ART DE VIVRE - CUISINE
- 33 = PÂTES aux champignons
- 34 = TEMPS LIBRE
- 34 = Mots croisés et sudokus
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- 36 = REGLEMENT DU JOURNAL

OXYGÈNE N°9

OXYGÈNE N°9

75,00 %

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Fond de page

X: 42,930 Y: -5,253 mm 100%



Dibujo vectorial



# KRITA

Pintura y dibujo digital



# Darktable

Alternativas a Adobe Photoshop,  
Illustrator, Lightroom, Fresco...

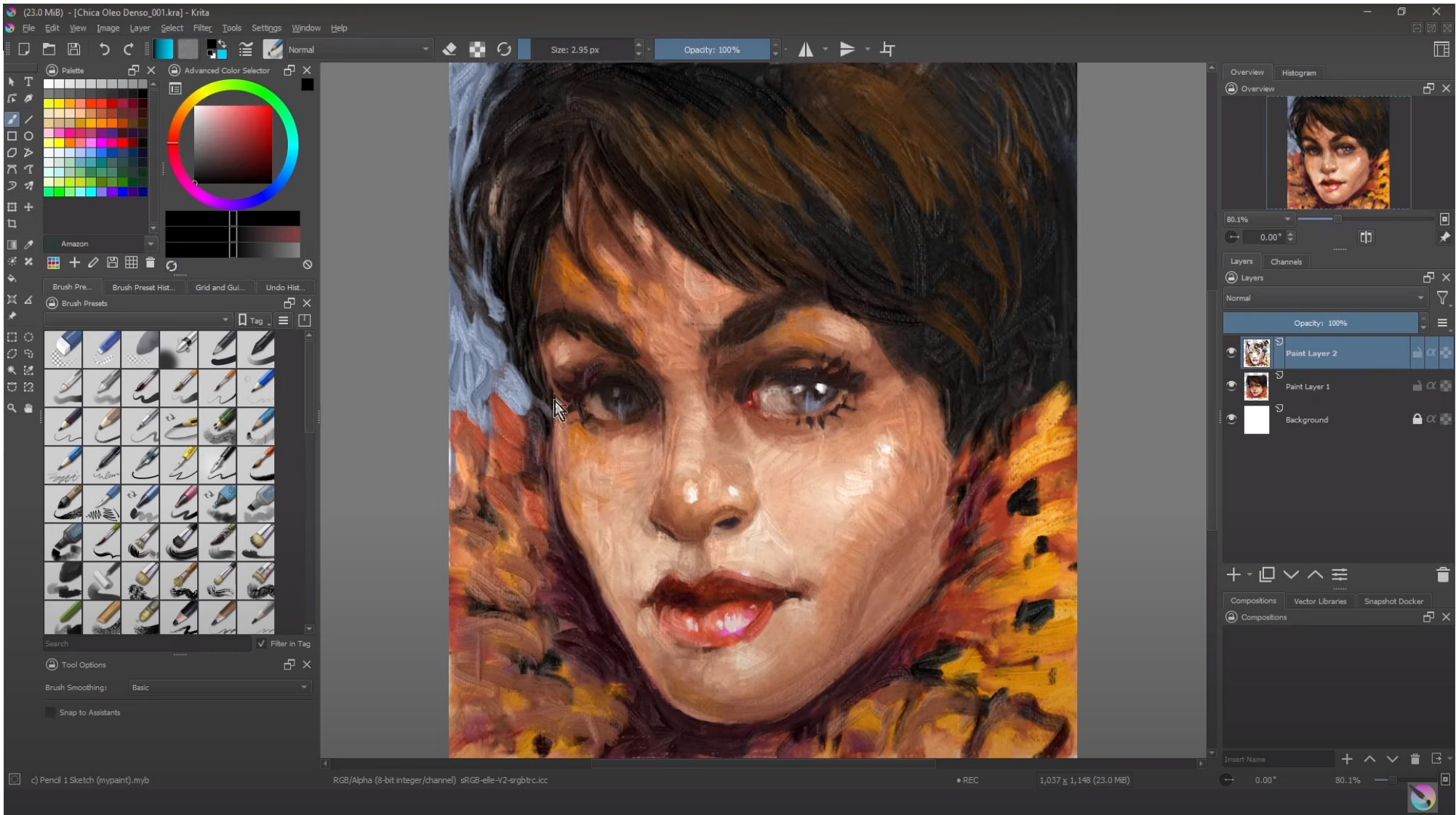


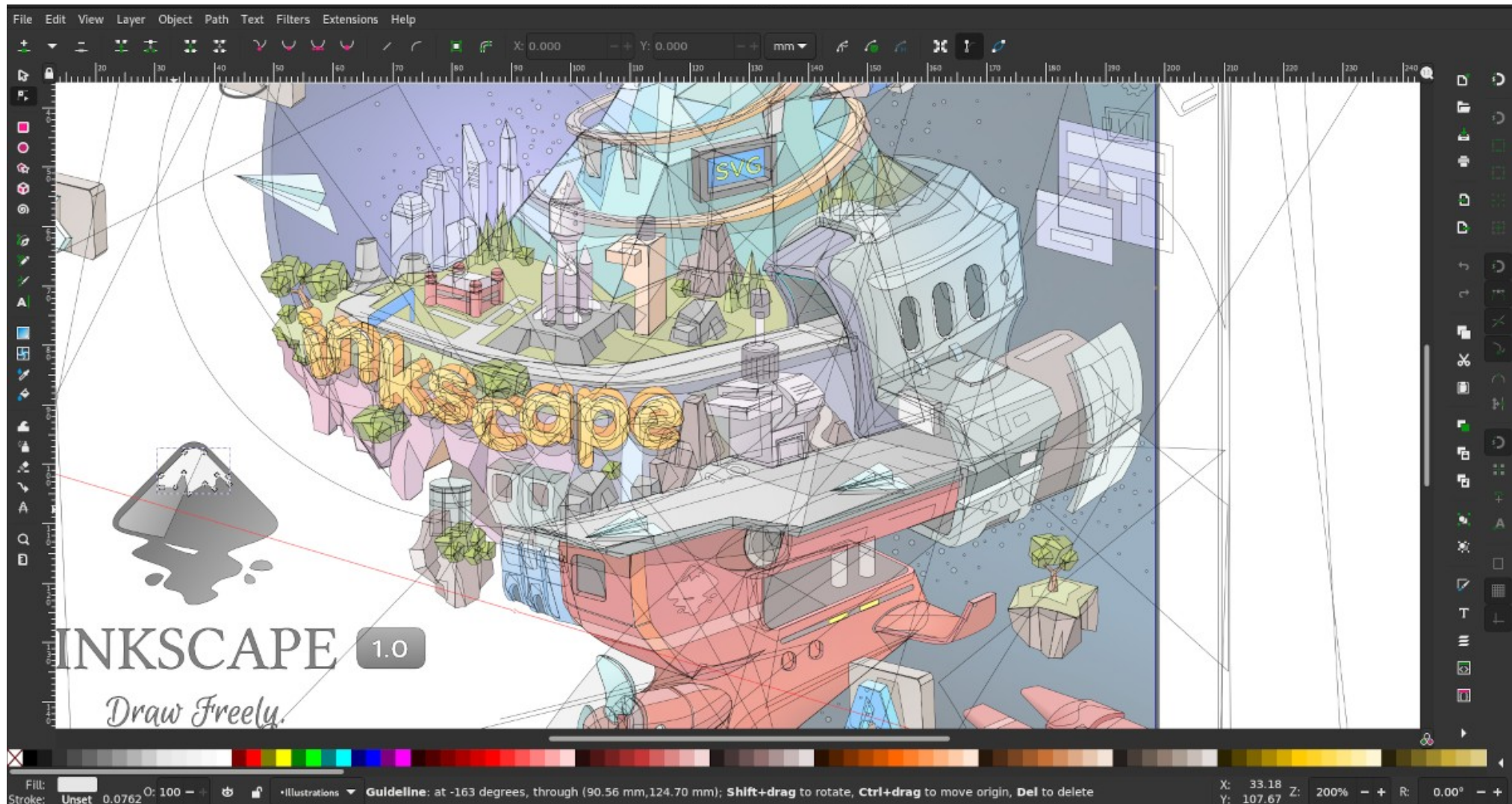
Edición RAW  
de imágenes



Alternativa a  
Photoshop

# *gimp*







# Audacity®

Navaja suiza para audio



Digital Audio Workstation  
(DAW)

Notación musical

# mûsescore

Alternativas a Adobe Audition, FL  
Studio, Ableton, Sibelius...

The screenshot displays the Audacity software interface. At the top, there is a menu bar with options: File, Edit, Select, View, Transport, Tracks, Generate, Effect, Analyze, Tools, Extra, and Help. Below the menu bar is a toolbar containing various icons for playback (stop, play, record, previous, next), editing (cut, copy, paste, delete), and analysis (waveform, spectrogram, zoom). The main workspace is divided into tracks. The top track is labeled 'Multi-view' and shows a blue waveform. Below it is a spectrogram view. The bottom track is labeled 'Stereo, 44100Hz 32-bit float' and also shows a blue waveform. The time axis at the top of the workspace ranges from 11.0 to 20.0 seconds. At the bottom, there is a status bar with the following information: Project Rate (Hz) 44100, Snap-To Off, Start and End of Selection (00 h 00 m 14.176 s to 00 h 00 m 17.194 s), and a large digital display showing 00 h 00 m 14 s.

The screenshot displays the Ardour DAW interface during a recording session. The top transport bar shows the current time at 00:01:27:13, with a selection range from 00:01:17:19 to 00:01:34:01. The main workspace is divided into several sections:

- Transport and Playback:** Includes buttons for Play, Stop, and various transport controls. The status bar indicates 'Playing' and 'Sprung'.
- Timeline and Waveforms:** Shows a timecode from 01:15:00 to 00:01:45:00. A 'SOLO' marker is visible. Waveforms for Bass DI, Vocal, Claps PRT-L, Keys L, Keys R, AC Gtr A...unce-1, E Gtr Lead, E Gtr L, E Gtr R, and Gang PRT-L are visible. An 'Overdub' region is highlighted in orange on the Vocal track.
- Mixer (a4-Live-Show - Mixer - Ardour):** Located on the right, it features faders and meters for Bass DI, Vocal, Claps PRT-L, and Keys L. Each track has a 'Disk' button and a 'Mute' indicator.
- Meterbridge (a4-Live-Show - Meterbridge - Ardour):** A central window showing a multi-channel level meter with green bars for each track.
- Channel Strips:** On the left, there are controls for various tracks including Fader, AUDynamicsPro, and Guitar Rig 5 FX.





The screenshot shows the MuseScore II interface with the following elements:

- Top Bar:** File, Edit, View, Add, Format, Tools, Plugins, Help, Diagnostic. Title: Der\_Abschied. Home, Score, Publish buttons. Parts and Mixer icons. Playback controls and a tempo of 54.
- Left Panel:** Palettes, Instruments, Properties. A search bar for "Add Palettes". A list of categories: Clefs, Key signatures, Time signatures, Tempo, Pitch, Accidentals, Dynamics, Articulations, Text, Keyboard, Repeats & jumps, Barlines, Layout.
- Score Area:** Title "Der Abschied" from "Das Lied von der Erde" by Gustav Mahler. Tempo marking  $\text{♩} = 54$ . Multiple staves for Oboe 1, Contrabassoon, Horn in F 1, Horn in F 2, Tuned Gongs, Harp 1, Harp 2, Violoncello, and Contrabass. A blue selection box highlights a passage in the Oboe 1 staff.
- Bottom Panel:** Piano keyboard with keys labeled C1 through C8. A range selection is shown at the bottom: "Range selection; Start measure: 5; Start beat: 1; End measure: 5; End beat: 4.875".



Guitarix



Surge XT

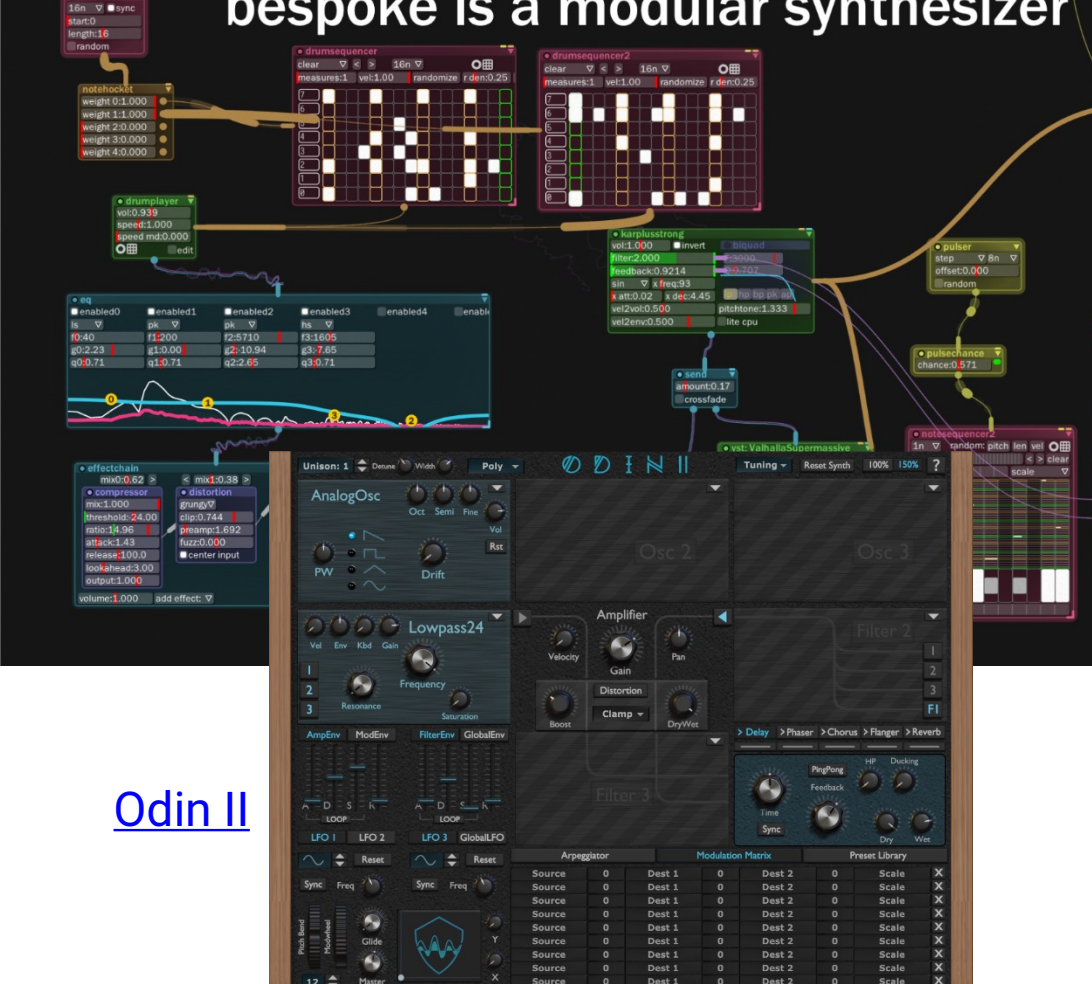


## [VCV Rack 2](#)



bespoke is a modular synthesizer

Helm

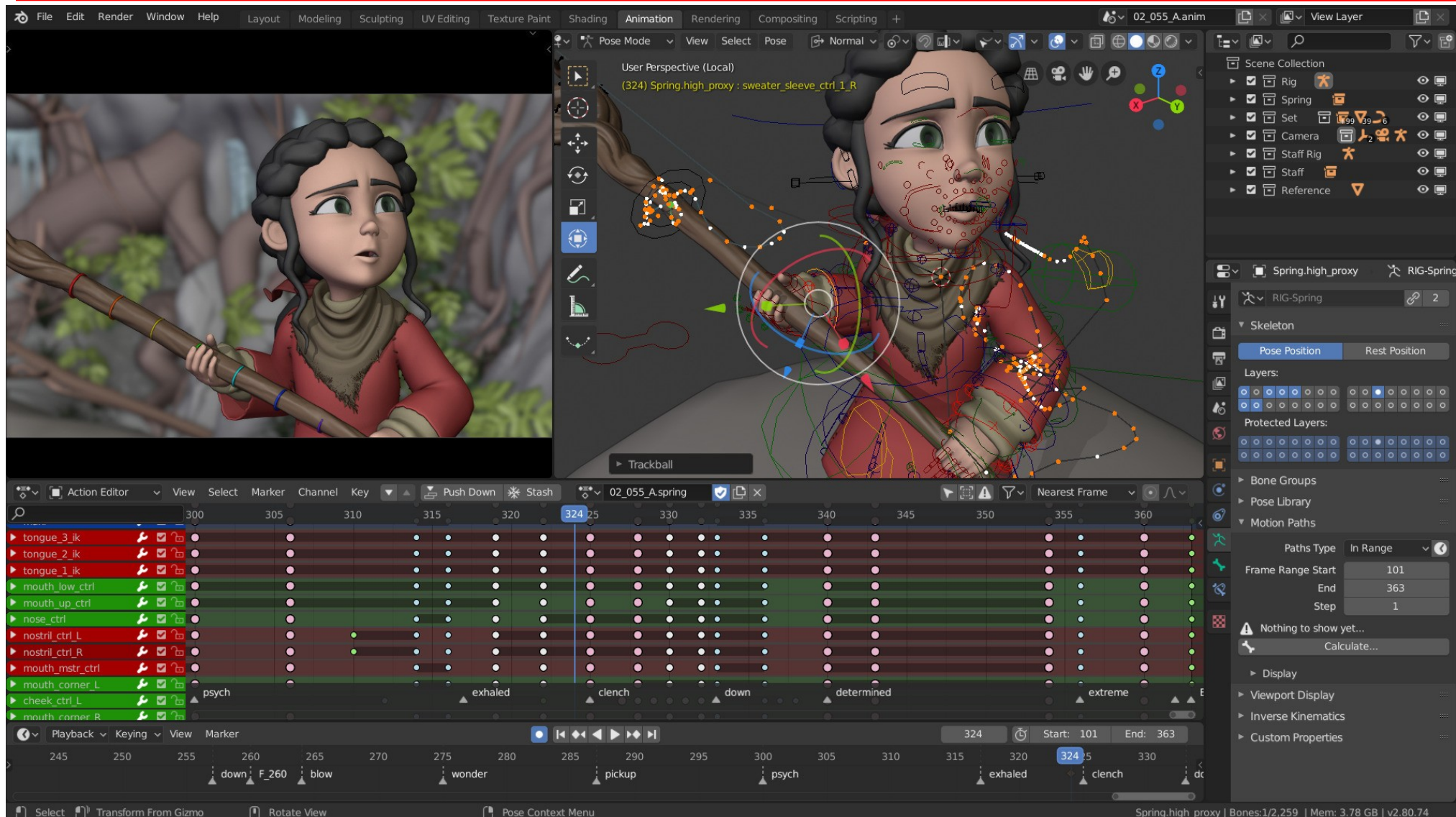


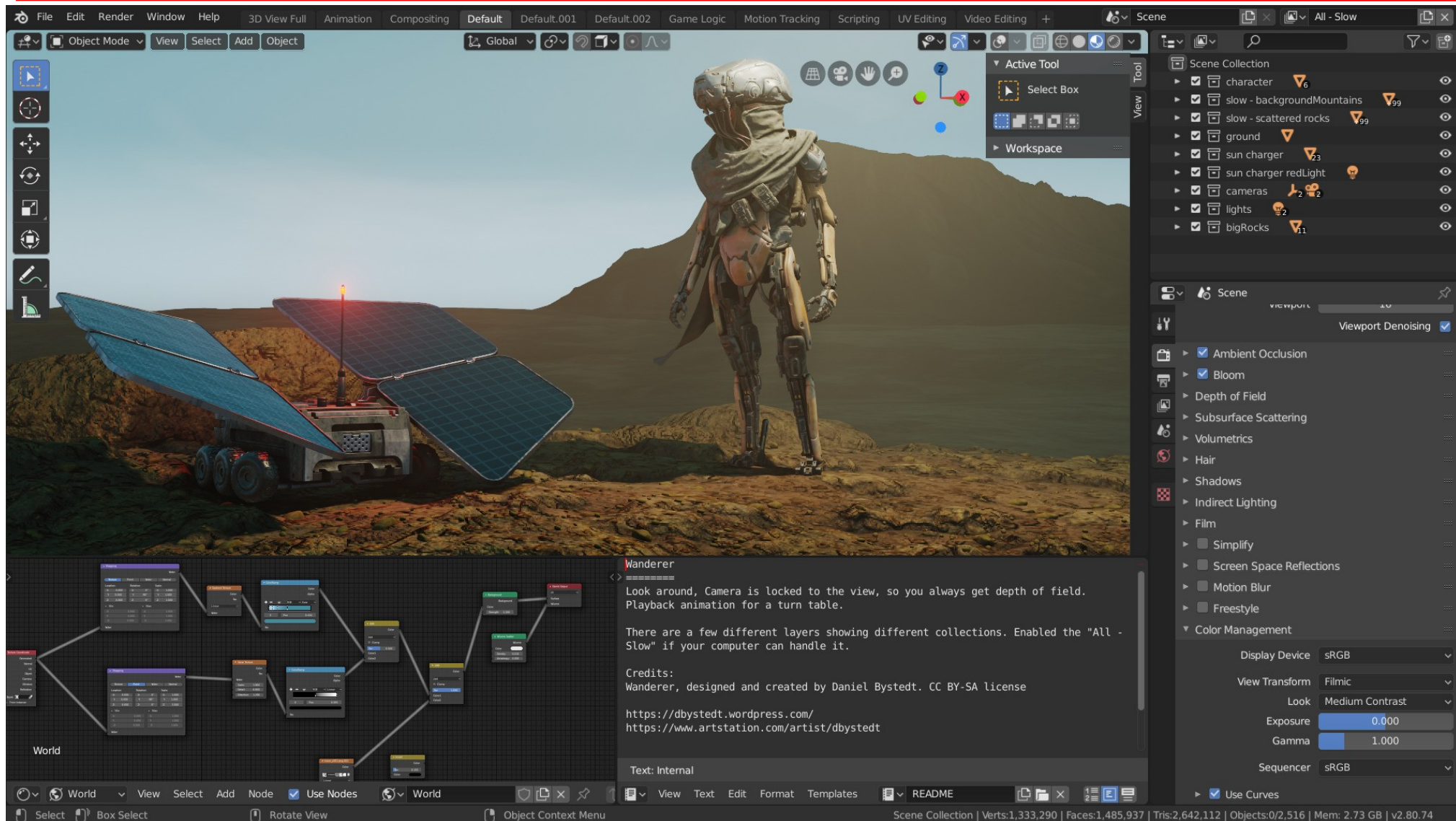
Odin II

¡Y muchos otros!

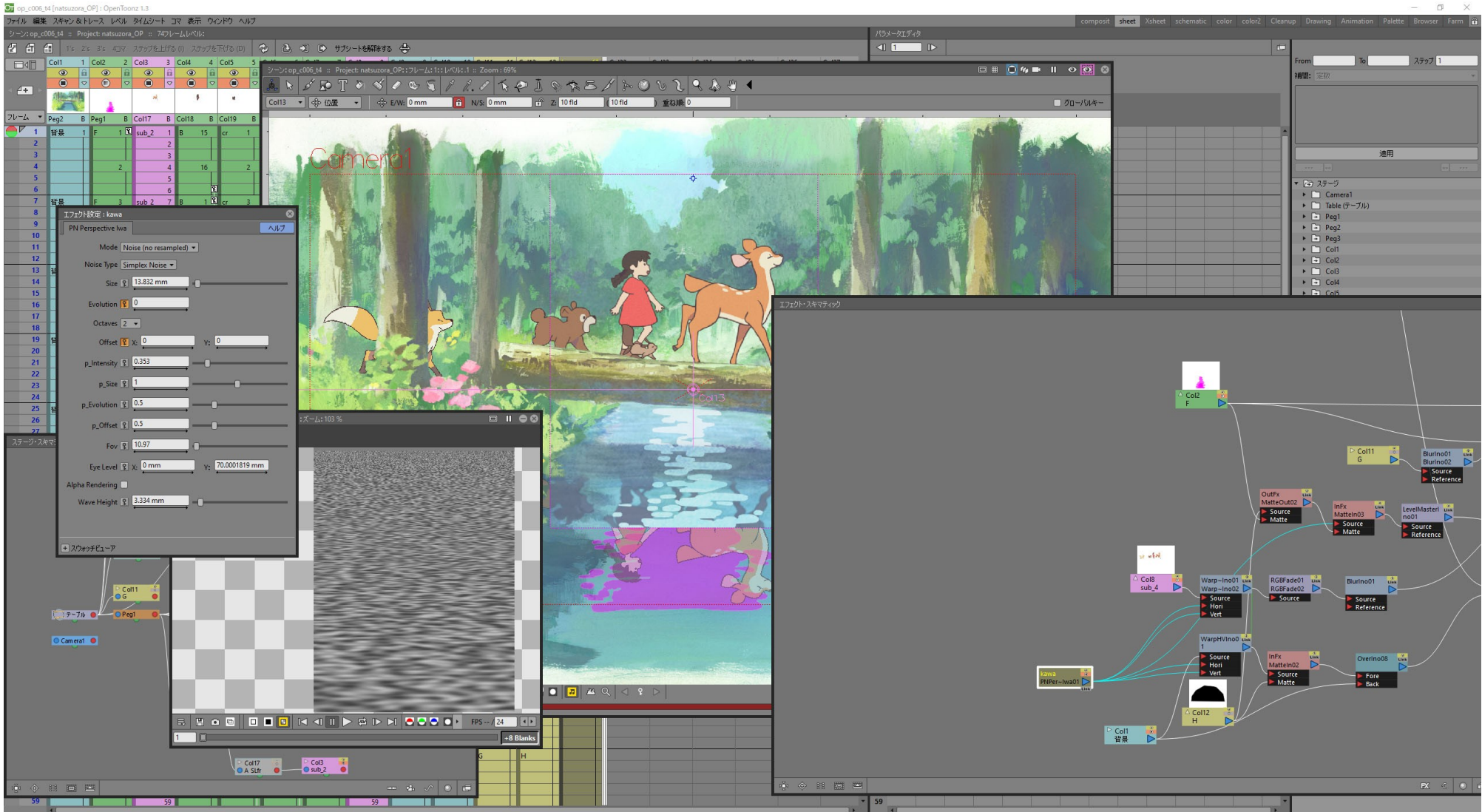
¡Es increíble este mundillo!













Open Broadcaster Software  
Se usa un montón por “streamers”. De altísima calidad y flexibilidad

¿Cursos,  
tutoriales?

¿Videos y  
retransmisiones?





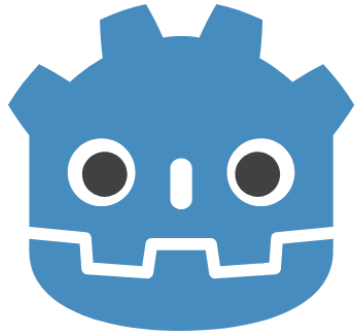
Editores no lineales de video  
(NLE)



Alternativas a Adobe Premier Pro,  
Vegas Pro, Final Cut...

The screenshot displays the Kdenlive video editing software interface. At the top, there is a menu bar with options: File, Edit, View, Project, Tool, Clip, Timeline, Monitor, Settings, Help. Below the menu bar is a toolbar with icons for various editing functions. The main workspace is divided into several panels:

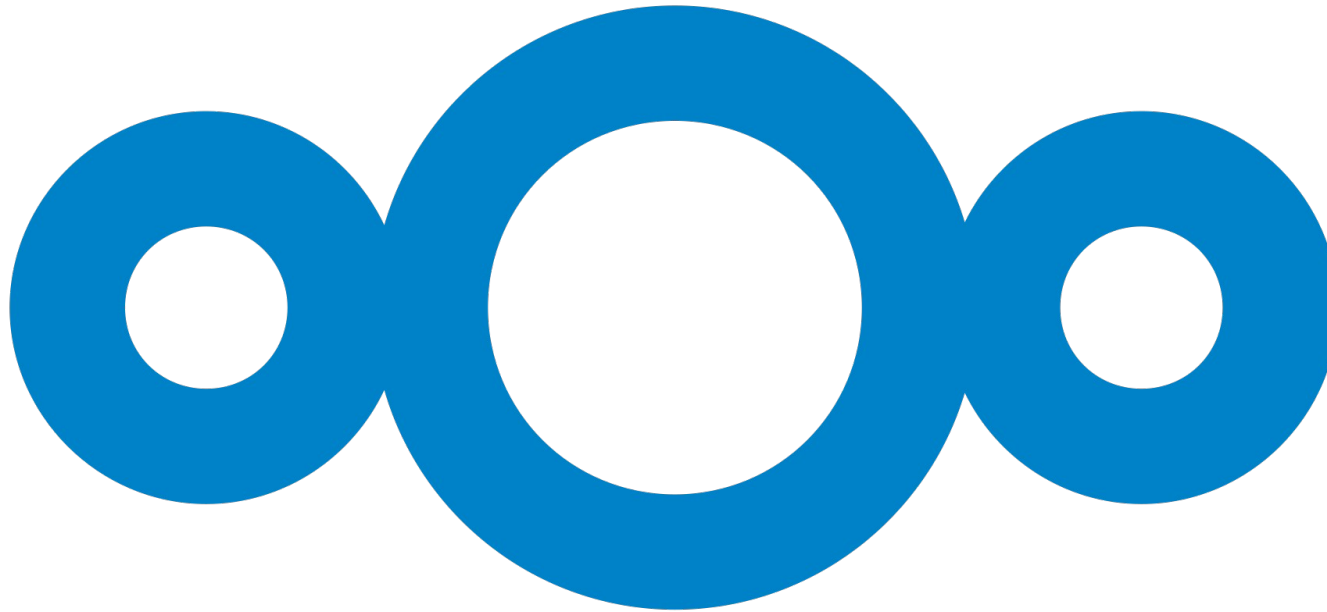
- Left Panel:** A list of effects and filters, including Alpha, Mask and Keying, Blur and Sharpen, Channels, Color and Image correction, Deprecated, Generate, Grain and Noise, Motion, On Master, Stylize, Transform, Distort and Perspective, Utility, and Volume and Dynamics.
- Top Center:** Two preview windows. The left one shows a woman sitting on stairs with a green audio waveform below it. The right one shows a woman in a colorful dress sitting on a bench with pink flowers. Both have a 25.00fps frame rate and a timecode of 00:00:00:00.
- Right Panel:** An effects panel for '31\_02\_Valeska\_Ferreira.MP4 effects'. It shows a 'Lift/gamma/gain' effect with three color wheels for Lift, Gamma, and Gain. The values are: Lift (R: 0.113, G: 0.133, B: 0.131), Gamma (R: 1.133, G: 1.221, B: 0.992), and Gain (R: 1.347, G: 1.255, B: 1.381).
- Bottom Panel:** A multi-track timeline. The top track is the Master track. Below it are tracks for video (V1, V2, V3, V4) and audio (A1, A2). The timeline shows various clips with their start and end times, and a green audio waveform at the bottom.



# GODOT

Útil para sistemas interactivos,  
simulaciones y de realidad aumentada





# nextcloud

Buena alternativa a Google Drive y Microsoft.  
¡Incluye casi todos los servicios, como edición de documentos colaborativa!



## ERP para hospitales:

- Fichas de paciente
  - Personal Health Record (PHR)
- Fichas de laboratorio
- Fichas del hospital
  - Electronic Medical Record (EMR)
  - Hospital Management (HMIS)
  - Health Information System (HIS)

## Usado en:

- Argentina
- Cruz Roja México
- Laos
- Camerún
- Gambia
- [España](#)
- Pakistán



[FontForge](#)



Diseño tipográfico

[Thunderbird](#)



Cliente de Emails



Administración de finanzas

¡Hasta videojuegos!

[O.A.D](#)



[Penpot App](#)

Diseño de aplicaciones y Web



- ❑ Creaciones artísticas o documentales
  - ▶ Ver las licencias [Creative Commons](#) (CC)
- ❑ Incluso las tipografías tienen licencias
  - ▶ Arial, Calibre, etc **NO** son libres. Alternativa: [Kurinto Fonts](#), [Google Fonts](#), [Fontlibrary](#), [Fontesk-OFL](#)
  - ▶ La licencia más común para fuentes libres es la [SIL OFL](#)
- ❑ También los formatos de video
  - ▶ Los típicos .mp4 (archivo de video), están codificados usando tecnología H.264 o H.265: **NO** son libres
  - ▶ Para no pagar licencias, Google, Netflix, etc han creado codecs libres: [VP9](#) y [AV1](#)
- ❑ **¡Y las apps de los móviles también!** Ver [F-Droid](#)

# Conclusiones

- ❑ Hay una grandísima cantidad de soluciones
  - ▶ Muchííísimas no han sido cubiertas aquí. ¡Buscadlas!
    - Ejemplo: ¿Análisis micrográfico de cristales? [Fiji](#)
  - ▶ Alguna siempre nos viene bien, aprovechadla
  
- ❑ Compartid esta información
  - ▶ Familia, amigos, uso personal
  - ▶ **Uso universitario, educacional:** ¡[Moodle!](#), [Oppia](#), [Canvas](#)
  
- ❑ Id poco a poco, no intentéis cambiar todo de golpe
  
- ❑ Algunos problemas “solo” se pueden resolver con software libre (flexibilidad, capacidad, costes...)

## ❑ Usad un buscador

- ▶ “open source alternative to XXX”. XXX software propietario
- ▶ “open source YYY”. YYY un tema (FEM, CFD, dibujo...)

## ❑ Analizad las distintas posibilidades

### ▶ A nivel de usuario

- ¿Tiene lo que busco? ¿Comunidad grande?
- ¿Buena documentación? ¿Tiene recursos de aprendizaje?

### ▶ A nivel de empresa

- ¿Hay una empresa con soporte por detrás? ¿Comunidad grande?
- ¿Usa tecnologías similares a las ya implantadas?
  - Lenguaje de programación: C++, Python, etc... Bases de datos...
- ¿Está actualizado, es moderno? Esto es relativo a la industria
- ¿Licencia? MIT vs BSD(2/3) vs Apache v2 vs (L/A)GPL v(2/3)

- ❑ Algunos programas son muy manuales y no traen muchas “librerías” preconfiguradas
  - ▶ Ejemplo: Code\_Aster no trae una librería de materiales, tuberías, etc. La GUI no ayuda mucho al usuario...
- ❑ Y a eso se le añade una difícil curva de aprendizaje
- ❑ La verificación de los programas cuesta dinero
  - ▶ Muchos tienen librerías de **pruebas validadas y son reproducibles, pero esto se suele pagar**
- ❑ Es un poco difícil de encontrar soporte externo en algunos casos para fallos, mejoras...

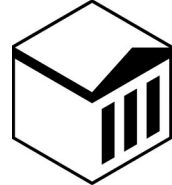
- ❑ El software propietario:
  - ▶ Busca hacerse una dependencia
    - No interopera con sistemas externos. **Crea deuda técnica**
    - ¿Subscripciones anuales? **Abusa la dependencia**
  - ▶ Pueden cambiar las condiciones ([cambios de licencia CERN](#))
  - ▶ Los cambios pueden no adaptarse al usuario, se buscan principalmente beneficios
  
- ❑ Hay que ser honestos con el software libre
  - ▶ Todo cambio lleva un coste temporal y monetario
  - ▶ Son sistemas y métodos de trabajo distintos (¡no peores!)
  - ▶ **El cambio ha de ser por propia iniciativa**
    - Este no es un caso al que estemos acostumbrados
    - La inversión inicial es alta en todo: investigar, aprender...

# Existen organizaciones para el apoyo de software libre en empresas

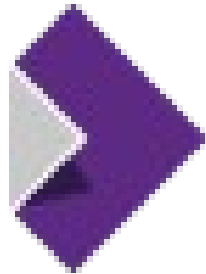


Fundación creada para integrar y operar software libre en compañías

Fundada por:



Foundation for Public Code



[Collabora](#)

consultoría de sistemas de documentación

## ¡Y otras muchas!

Comisión Europea  
Joinup Licensing Assistant  
[Find and compare licenses](#)

Good Governance Initiative (GGI)  
[handbook](#)

Ya hay compañías enormes que se han dado de alta



Open Source Law,  
Policy and Practice

Second Edition  
AMANDA BROCK

OXFORD



- ❑ Posibilidad de integración de estas herramientas en las ya existentes
  - ▶ ¿Dakota, OpenTURN u OpenMDAO en EcoSimPro?
    - ▶ ¿Y Cantera o Mutation++ para un módulo de combustión?
  - ▶ ¿Persalys para ANSYS?
  - ▶ ¿Blender para vender el producto al cliente?
  - ▶ ¿Code\_Aster para análisis complejos y profundos?
- ❑ Reducción de costes
- ❑ Aprendizaje, entrenamiento, **know-how**
- ❑ Nuevas soluciones innovadoras o ancilares
- ❑ Automatización, mejoras a los sistemas actuales...

- ❑ ¿Qué es el software libre?
  - ▶ Las cuatro libertades/derechos
- ❑ ¿Qué ofrece la filosofía libre a cada uno o la sociedad?
  - ▶ Flexibilidad
  - ▶ Aprendizaje
  - ▶ Comunidad
- ❑ ¿Qué soluciones hay?
  - ▶ Montones, algunas de muy buena calidad
  - ▶ ¡Hay que buscarlas!
- ❑ El software propietario trae problemas intrínsecos
- ❑ El software libre está listo para el mundo empresarial

# ¿Preguntas?

Licencia: CC-4.0-BY-SA

Estoy disponible para lo que necesitéis  
[foleo@empre.es](mailto:foleo@empre.es)

Correo personal  
[irvise@irvise.xyz](mailto:irvise@irvise.xyz)

## ❑ FOSDEM (Free and Open source Software Developers' European Meeting) 2023, Bruselas 4 y 5 de febrero



## □ Podemos ver “rápidamente”

### ▶ CoolProp

- Uso de la interfaz PropsSI (Python)

```
import CoolProp.CoolProp as CP # HEOS::R32[0.697615]&R125[0.302385]
CP.PropsSI('D','P',68e5,'T',300,"CO2")
Out[21]: 689.1314547444613
CP.PropsSI('D','P',68e5,'T',301,"CO2")
Out[20]: 266.54485685623814
CP.PropsSI('d(D)/d(T)|P','P',68e5,'T',300,"CO2") # Cálculo de derivadas!
Out[19]: -31.962307565403005
```

- ¡También tiene addon de Excel!

### ▶ Maxima: example(diff);

### ▶ QUCS-S: audio\_amp, DBM\_mixer

### ▶ DWSIM: LiBr-H2O, Amonia-Water, Biodiesel-production

### ▶ Scilab: CACSD – Inverted pendulum; Optim&Sim – nmpplot McKinnon #2 & #1; Simulation – Bike & Flow