

# The NURESIM software

To use most of the codes, it is necessary to ask a user license agreement to the owner of the code (or to one of the owners). In principle, licenses are free for use limited to research and development purposes.

Code	Scope	Highlights	How to get the code
<i>Common generic tools</i>			
<b>SALOME</b>	Software that provides a generic platform for pre and post-processing and coupling for numerical simulation	Open source Includes CAD (Computer Aided Design) interface Website: <a href="http://www.salome-platform.org/">http://www.salome-platform.org/</a>	Open-source software, can be downloaded from the website
<b>URANIE</b>	Software that provides a generic platform for uncertainties analysis for numerical simulation	Based on ROOT software developed by CERN for large database numerical processing. Website: <a href="http://sourceforge.net/projects/uranie/">http://sourceforge.net/projects/uranie/</a>	Open-source software, can be downloaded from the website
<i>Reactor system simulators</i>			
<b>CATHARE</b>	Analysis of the whole spectrum of leaks and transients in PWRs and BWRs	CATHARE2 with 2-fluid model: Extensive validation for PWR CATHARE-3: R&D version with multi-field, Transport of Interfacial area and turbulence modeling capabilities in 0D, 1D and 3D Website: <a href="http://www-cathare.cea.fr/scripts/home/publigen/content/templates/show.asp?L=EN&amp;P=134">http://www-cathare.cea.fr/scripts/home/publigen/content/templates/show.asp?L=EN&amp;P=134</a>	Ask CEA for a User License agreement
<b>ATHLET</b>	Analysis of the whole spectrum of leaks and transients in PWRs and BWRs	Validation for PWR & BWR Website: <a href="http://www.grs.de/en/computer-code-athlet">http://www.grs.de/en/computer-code-athlet</a>	Ask GRS for a User License agreement <a href="http://www.grs.de">www.grs.de</a>
<i>Core simulators</i>			
<b>COBAYA3</b>	PWR and BWR Core simulation inc. neutronics and a simplified thermal-hydraulics model, for normal operation and transients	2D, 3D, cartesian, hexagonal geometries. Multigroup diffusion with IDF (Interface Discontinuity Factors). Pin-by-pin & nodal solvers. Domain decomposition, Parallelization. Steady state and transient problems. Specific simplified thermal-hydraulics capacity	Ask UPM for a User License agreement
<b>DYN3D</b>	PWR and BWR Core simulation inc. neutronics and a simplified thermal-hydraulics model, for normal operation and transients	3D cartesian, hexagonal, triangular geometries. Multigroup solvers: Diffusion and SP3 Pin power reconstruction Steady state and transient problems. Specific simplified thermal-hydraulics capacity	Ask HZDR for a User License agreement
<b>CRONOS</b>	PWR and BWR Core simulation inc. neutronics and a simplified thermal-hydraulics model, for normal operation and transients	1D, 2D, 3D, cartesian, cylindrical, hexagonal geometries. Multigroup Solvers: Finite differences, Pn and Sn Transport. Static and kinetic calculations. Burnup simulation nuclide by nuclide Specific simplified thermal-hydraulics capacity	Ask CEA for a User License agreement

<i>Neutronics</i>			
<b>APOLLO2</b>	Lattice code for PWR and BWR: cross-section generation for core-simulators Reference deterministic simulations.	2D spectral and core code. Multigroup and Multiparameter XS's generation. MOC solvers, collision probability solvers	Ask CEA for a User License agreement
<b>TRIPOLI4</b>	Monte-Carlo code applicable for core physics, criticality and shielding studies	Monte Carlo method to simulate neutron and photon behaviour in three-dimensional geometries Static and kinetic calculations	Code can be downloaded from the OECD NEA website, under a standard license agreement
<i>Thermal-hydraulics</i>			
<b>NEPTUNE_CFD</b>	CFD 2-phase thermal-hydraulics code	2-fluid & multi-fluid 2-phase CFD (Computational Fluid Dynamics) Models for boiling bubbly flow and for free surface flow Developments on-going for all flow regimes	Ask EDF for a User License agreement
<b>TRIO_U</b>	Single-phase CFD Two-phase pseudo-DNS	Single phase CFD (RANS & LES) 2-phase pseudo DNS with Interface Tracking Method	Ask CEA for a User License agreement
<b>TransAT</b>	Single-phase CFD Multiphase CFD & CMFD	Phase average N-phase model Interface Tracking Phase change heat transfer Lagrangian droplet tracking (2 way) Compressible multiphase flow	Ask ASCOMP for a User License agreement
<b>FLICA</b>	Sub-channel core thermal-hydraulics	Two phase TH simulation for BWR and PWR	Ask CEA for a User License agreement
<b>COBRA-TF (CTF)</b>	Multipurpose subchannel thermal-hydraulics	Two-phase, three field equations models, flexible geometry definition for PWR and BWR applications, improved numerical solvers, parallelization, vertical and horizontal flow regimes, RPV and core thermal hydraulics, up-flow and reverse flow, boron tracking models, etc.	Ask Penn-State University for a User License agreement
<i>Fuel-Thermomechanics</i>			
<b>DRACCAR</b>	Fuel behaviour during LOCA, Spent fuel pool LOCA,	3D thermomechanics modeling from a single rod to a full core. Modeling of fuel rods ballooning, contact between rods, fuel relocations, cladding oxidation under steam and air conditions, hydriring, impact on flow and fuel cooling and integrity.	Ask IRSN for a User License agreement
<b>SCANAIR</b>	Single Fuel Rod behavior during RIA	2D thermomechanical modeling of a single rod Specific model for clad behavior during RIA (included rupture modelling) Specific Thermalhydraulics and fission gas behavior models for RIA	Ask IRSN for a User License agreement