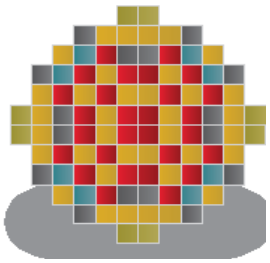
Studsvik

SIMULATE5

Next-Generation Nodal Code for LWRs

SIMULATE5 is a 3D, steady-state, multi-group nodal code for the analysis of LWRs. SIMULATE5 delivers vendor independence and unparalleled accuracy for advanced core designs with increased heterogeneity and aggressive operating strategies.



Truly Advanced

Highly heterogeneous cores and aggressive operating strategies have pushed existing reactor analysis methods to their limit.

Studsvik, the global leader in reactor analysis software, has developed SIMULATE5 to address these deficiencies and meet the demands of current and future core designs with cutting-edge neutronic and thermalhydraulic methods not found in any other analysis package.

Engineering Applications

SIMULATE5 is built to meet the needs of reactor engineers and core designers, with functionality to support startup physics testing, power maneuver guidance, thermal limit assessment, shutdown margin calculations, control rod absorber depletion and fluence tracking, and much more.

Proven Results

Studsvik's 40 years of experience producing flexible, highly accurate software solutions for the nuclear power industry is reflected in the state-of-the-art reactor physics methods and engineering features in SIMULATE5.

Fully capable of modeling all current and next generation PWRs, BWRs and SMRs with first-principle neutronic and thermal hydraulic calculations, SIMULATE5 provides a robust, single solution to core design and core analysis requirements.

In addition, Studsvik offers a separate SIMULATE5-VVER product for VVER plant designs.

SIMULATE5 is the most advanced steady-state nodal code available for current and future challenging core designs.

Fuel Management

SIMULATE5 efficiently and accurately verifies core loading pattern designs even with complicated core designs containing:

- Reprocessed uranium and/or MOX
- Integrated burnable poisons (gadolinia, erbia, IFBA), removable poisons (WABA, Pyrex), and combinations of both
- Part-length fuel rods
- In-core instrumentation for power monitoring, including U-235 fission chambers, rhodium and platinum detectors, gamma and neutron TIPs, vandadium aeroballs, and gamma thermometers.

The SIMULATE5 model supports fuel studies and validates vendor-predicted cycle lengths, ensuring the maximum return on your fuel investment.

Driven by CASMO5

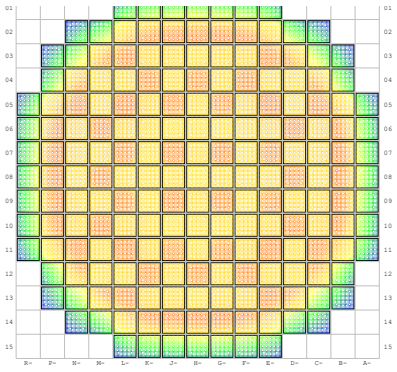
SIMULATE5's advanced neutronics engine demands more accurate physics models for assemblies containing high mixed-oxide (MOX) or burnable poison concentrations. CASMO5 has been developed specifically to support the increased requirements of SIMULATE5. Together, they comprise the most advanced light water reactor physics analysis system in the world.

Advanced Thermal-Hydraulic Model

SIMULATE5 includes more complete thermal-hydraulic modeling outside of the core by extending the thermal hydraulic model from the lower to upper tie plates in PWRs and including the entire vessel loop in BWRs.

Many advanced BWR thermal hydraulic models have been synthesized into a generic solver, ensuring accuracy even in complex scenarios, such as PWR voiding.

Momentum equation solvers allow cross flow modeling – between assemblies in PWRs and within quadrants of assembly in BWRs.



SIMULATE5 provides accurate results for any type of PWR, BWR or SMR.

Core Follow and Operational Support

Once established, the SIMULATE5 core model can perform a variety of automated core follow calculations to support reactor operations, including reactivity coefficients and rod worth analysis, that would otherwise take hours of tedious user input.

Intelligent search routines allow the user to quickly search for quantities such as critical boron or rod position, based on a variety of bounding parameters.

Methodology

The newly designed SIMULATE5 neutronics engine solves the multi-group diffusion equations with a hybrid micro-macro depletion model that includes more than 50 explicitly defined actinide and fission product nuclides.

Radial and axial heterogeneities are treated using a proprietary submeshing scheme to overcome the shortfalls of spatially-averaged cross-sections and discontinuity factors. An improved, multi-group pin power reconstruction model, which combines homogeneous power shapes with pin form factors evaluated from CASMO5, captures instantaneous spectral effects and exposure-induced pin power variations.

Requirements

SIMULATE5 is available for all standard computing platforms running most modern 64-bit operating systems. Linux and Windows architectures are supported environments for SIMULATE5.

Unparalleled Customer Support

Studsvik's technical support is built on putting the needs of its customers first.

- 24-hour response time
- Easy ticketing system
- On-line support portals
- Access to technical documentation
- Active and growing user communities of practice

For further information please contact:

Your Studsvik representative or
e-mail: **cms-info@studsvik.com**