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Development of a real-time simulation RELAP/SUNDIALS code for the Dalat Nuclear Research Reactor

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The Reactor Excursion and Leak Analysis Program (RELAP5) is a light water reactor transient analysis code for simulation of hydraulic and thermal transients in both nuclear and nonnuclear systems for which a new RELAP5-based real time simulation code has been developed at the Center for Nuclear Technologies (CNT) for the Dalat Nuclear Research Reactor (DNRR) in Vietnam. However, a probable bug in the RELAP5 reactor kinetics (rkin) module causes nonphysical reactor power curve when small calculations time steps are applied. This paper proposes a new code so-called RELAP/SUNDIALS, by coupling the software package SUN-DIALS (SUite of Nonlinear and DIfferential/ALgebraic Equation Solvers) and RELAP5 together to replace the implementation of the original Runge-Kutta method to which is of implicit and explicit iterative numerical analysis. Both RELAP5 and RELAP/SUNDIALS were compared against benchmark cases and the latter proved to be superior in terms of calculation accuracy.

Minioral

Yes

IEEE Member

No

Are you a student?

No

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