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Models of the integral EUCLID/V2 code for numerical modeling of different regimes of lead-cooled fast reactor

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The EUCLID/V2 integral multiphysics computer code is designed for the safety analysis and justification of the new generation NPPs with liquid metal cooled fast reactors under normal operating conditions, anticipated operational occurrences, design basis accidents and severe accidents. The EUCLID/V2 code includes the system thermohydraulics module (HYDRA-IBRAE/LM), spatial time-dependent neutronics module (DN3D/CORNER), quasi two-dimensional fuel rod module (BERKUT), the module of burnup and decay heat calculations (BPSD), the module of fission, activation and corrosion products transport in primary loop and gas system of a reactor facility (AEROSOL-LM), the tritium migration module (TRITIUM), the module of fission product source calculation, the fuel rod and core disruption module (SAFR), the modules of mass transfer and fission product transport calculation in the reactor containment compartments (HYDRA-IBRAE/LM or KUPOL-BR), the module of simulation of radiation situation beyond industrial site of a NPP (ROM).
The mentioned modules are multi-purpose, their models do not depend on a coolant or fuel type and may be used to simulate reactor facilities with sodium, lead or lead-bismuth coolant and nitride or oxide fuel. However, some special models needed for behavior simulation of reactor facilities with lead coolant have been implemented into the EUCLID/V2 integral computer code. They are the model of solid phase impurities transport in a primary loop of a reactor facility with heavy liquid metal coolant, the model for a steam generator tube rupture simulation of a reactor facility with the lead coolant, the model of fission product source calculation taking into account physicochemical interaction between the nitride fuel and the lead coolant, the nitride fuel dissociation model, the lead melt and concrete interaction model, the lead freezing model.
At present, the V&V of the listed above modules and models is being carried out on analytical and numerical tests and experimental results.
In the contribution the brief description of the above mentioned models and some V&V results are presented.

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