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Modelling and Simulation of Heat Transport System and Steam Power Transition System of CEFR

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In this paper, the graphics interface and parameter modeling real-time simulation software, Jtopmeret, was used to model and simulate the intermediate heat transport system and the steam power conversion system of China Experimental Fast Reactor (CEFR). The two-phase, multi-component models were taken into consideration to simulate the flow and heat transfer of working medium sodium and steam-water Rankine cycle. The matrix solving method was used in this paper to solve the mass, momentum, and energy conservation equations accurately, quickly and steady. Operating characteristics under steady, transient and malfunction operations of CEFR were researched. The simulation results showed that the errors of main parameters under different steady operations were less than 1%, the trend curves under transient operations and malfunction operations were reasonable, and the response of the secondary and third loop could show the operating and safety characteristics of CEFR. The models had been applied to full scale simulator of CEFR.

Keywords: China Experimental Fast Reactor (CEFR), modeling and simulation, two-phase, multi-component models

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