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# A Genetic Neuro-Fuzzy Logic for DNB Protection

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## Abstract

A neurofuzzy method is used to estimate the DNB protection limit using the measured average temperature and pressure of a reactor core. The neurofuzzy system parameters are optimized by two learning methods. A genetic algorithm is used to optimize the antecedent parameters of the neurofuzzy inference system and a least-squares algorithm to solve the consequent parameters. Two neurofuzzy inference systems are used according to the pressure and temperature regions. The proposed method is applied to the Yonggwang 3&4 nuclear power plant and the proposed method has 5.84 percent larger thermal margin than the conventional Westinghouse $OT\Delta T$ trip logic. This simple algorithm can provide a good information for the nuclear power plant operation and diagnosis by estimating the DNB protection limit each time step.