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**DEVELOPMENT OF A SYSTEM FOR MONITORING AND DIAGNOSIS OF
STEAM GENERATOR TUBES USING ARTIFICIAL INTELLIGENCE
TECHNIQUES ON EDDY CURRENT TEST SIGNALS**

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ABSTRACT

New classification and feature extraction methods for steam generator tube defects are being developed by Ipen/Cnen-Sp in cooperation with UTK to improve a monitoring and diagnosis system for classification and characterization of steam generator tube defects using Eddy Current Testing (ECT) signals. The first methodology being developed uses a set of feature extraction methods applied to different tube defect type ECT signals and each obtained feature vector is projected into a bi-dimensional map obtained by a Self-Organizing Map (SOM) neural network. This methodology allows an optimal feature extraction method selection for the defect type classification. Other approach is being developed using tubes with different manufactured defect types which are tested using MIZ-17ET equipment with 4 sets of probes (two different diameter). A fuzzy inference system will be used to build a knowledge base for these defects. These methodology and algorithms will be integrated into an automated diagnosis system being developed with UTK, which is designed to read both on-line acquired data, as well as stored data files. These commercial software tools are the ones usually utilized in nuclear power plants.

(In English)