

Master Thesis Review

Name Bc. Jakub Hořeňovský

Task Creation and Development of Soft Computing Models for Use in Nuclear Engineering

Form and technical Content of the Master Thesis Mr. Hořeňovský wrote his master thesis on the Institute of Process Technology, Process Automation and Measuring Technology (IPM) at the Zittau/Goerlitz University of Applied Sciences. The main goal of the thesis was the creation and analysis of Soft Computing models (SCM) for a core state monitoring during a severe accident in pressurized water reactors (PWR). The core state monitoring based on the measurement of gamma radiation outside of the reactor pressure vessel by means of several gamma radiation sensors. Due to the SCMs changing gamma ray distributions outside of a reactor pressure vessel should be classified and through this an identification of core destruction states should be possible.

After an introductory chapter in which the position and the objective of the work are described, follows the chapters two and three with the state of the art. The content of these chapters are general information about pressurized water reactors, expiration of a core melt down in a PWR, in this thesis used Soft Computing methods as well as evaluation methods for theses SCMs. Due to their structure and extent, these chapters contribute very well for the understanding of the thesis.

In the fourth chapter takes place the creation of Soft Computing models (Fuzzy model by Mamdani, Fuzzy models by Takagi, Sugeno, Kang with the cluster algorithm by Wong and Chen, Multilayer Perceptrons) for the use to the classification of gamma ray distributions. Following the model quality of the created SCMs was analyzed by certain evaluation methods. The conclusion of this chapter is the comparison between the different SCMs.

In chapter five different sensitivity analyses were performed and discussed. For this purpose sensor defects (sensor failure, inadequate calibration) were assumed. In particular, it has been investigated in what extent the created SCMs in the case of a sensor defect are still able to provide sufficiently accurate classification results.

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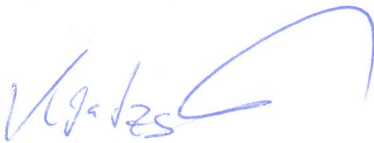
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The thesis concludes with a summary and an outlook.
The goal of the thesis was almost completely fulfilled. For a completely fulfilled thesis in chapter five further investigations for leveling of sensor defects would have been necessary.
The requirements for content, structure and extent of a scientific paper are fully met. Within the document, no spelling and grammatical errors can be seen.

Rating Proposal for 1,7
thesis (university)
Rating proposal für 1,7
thesis (company)



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