

**UNIVERSITI TEKNOLOGI MARA**

**TECHNICAL REPORT**

**(FUZZY STATE SPACE OF MULTIVARIABLE SYSTEM)**

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## **ABSTRACT**

State Space Model (SSM) is a type of probabilistic graphical model that is presented here. SSMs are known by various names, such as latent process models and hidden Markov models. The aim of this research is to analyse the typical problem of controlling and maintaining the water level in a boiler system. The flow of the boiler system must function properly, with the quantity of water exiting neither too little nor too much. Otherwise, the compartment in front of it may be severely impacted. The purpose of this research is to evaluate the performance of the boiler system's drum and reheater. The data has been analysed using MATLAB programming and displayed using Simulink and simulation. The simulation findings indicate that the operation of the reheater and the outflow of the drum follow a similar pattern. In accordance with this, the three objectives of this research are to investigate boiler and combined cycle power plants via SSM, to integrate the FSSM in the Drum and Reheater of the combined cycle power plant, and to simulate the uncertain model parameters of the Drum and Reheater. Implementing the method presented in this research is a daunting challenge in the domains of mathematics and engineering, which highlights the significance of this research. The results can be utilised in numerous ways. By adding SSM into the Drum and Reheater System, the boiler's performance has been drastically enhanced. By utilising MATLAB programming and MATLAB Simulink, the time required to determine the boiler system's equation was reduced. In conclusion, for the Drum and Reheater System from the boiler in a combined cycle power plant, there are many calculated results of different uncertain model factors. The outcomes have a wide range of applications. The Drum and Reheater System's performance has significantly improved because to the addition of SSM. MATLAB programming and MATLAB Simulink were used to speed up the process of finding the equation for the boiler system. In conclusion, there are several computed findings of various uncertain model parameters for the Drum and Reheater System from the boiler in a combined cycle power plant.