Modeling of waste water treatment plant via system Id & model reduction technique

Abstract

This paper investigates the application of Model Order Reduction (MOR) technique to Waste Water Treatment Plant (WWTP) system. The mathematical model of WWTP is obtained by using System Identification. In this paper, Prediction Error Estimate of Linear or Nonlinear Model (PEM) is proposed as the System Identification method which is used to find the parameter of linear or nonlinear system in state-space model from an experimental input- output data WWTP. The result shows that the estimated model of WWTP is a high order system with good best fit with 91.56% and80.19% compared to the original experimental model. To simplify the obtained model,the MOR technique is proposed to reduce the high order system to lower order system while still retaining the characteristics of the original system. In this paper, the balanced truncation and Frequency Weighted Model Reduction (FWMR) are proposed to obtain a lower order WWTP model. The result shows that by MOR techniques, the higher WWTP system can be simplified to lower order system with a low error of the reduced system. The result of reduced model will be represented in sigma graph and numerical value.