

Comparative study of estimation methods of NO_x emission with selection of input parameters for a coal-fired boiler

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This study focuses on estimation of NO_x emission and selection of input parameters for a coal-fired boiler in 500 MW power generation plant. The initial operating input parameters are determined based on operation heuristics and accumulated operation knowledge, and the essential input parameters are selected by sensitivity analysis where the performance of the estimation model is assessed as one or some input parameters are successively eliminated from the computation while all other input parameters are retained. From the sequential input selection process, less than 10 input parameters were survived out of 36 initial input parameters. Auto-regressive moving average (ARMA) model, artificial neural networks (ANN), partial least-squares (PLS) model, and least-squares support vector machine (LSSVM) algorithm were proposed to express the relationship between the operating input parameters and the content of NO_x emission. Finally, the principal components analysis (PCA) apply to enhances the estimation performance of each model.