Multi−Fault Diagnosis of Signed Diagraph and Dynamic Partial Least Squares for the Multi−Stage Flash Distillation

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Among many fault diagnosis methodologies, the signed digraph(SDG) offers a simple and graphical representation of the causal relationship between process variables and have been widely used. Also, Partial Least Square(PLS) has been shown to be a powerful regression technique for problems where the data is noisy and highly correlated like chemical process data. This study presents a multiple fault diagnosis method of signed diagraph(SDG) and Partial Least Square(PLS). Especially, this study uses modified SDG model that overcomes the weakness of SDG through the qualitative measure of fault propagation path. Moreover, the past values of cause and effect variables are inputted to PLS model as well as the current values of casual variables to represent the process dynamics. The proposed methodology will be illustrated through case studies of the multi−stage flash distillation with the brine heater: one of the desalination processes.