

A recursive PLS-based soft sensor for prediction of the melt index during grade change operations in HDPE plant

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Abstract—An empirical model has been developed for the successful prediction of the melt index (MI) during grade change operations in a high density polyethylene plant. To efficiently capture the nonlinearity and grade-changing characteristics of the polymerization process, the plant operation data is treated with the recursive partial least square (RPLS) scheme combined with model output bias updating. In this work two different schemes have been proposed. The first scheme makes use of an arbitrary threshold value which selects one of the two updating methods according to the process requirement so as to minimize the root mean square error (RMSE). In the second scheme, the number of RPLS updating runs is minimized to make the soft sensor time efficient, while reducing, maintaining or normally increasing the RMSE obtained from first scheme up to some extent. These schemes are compared with other techniques to exhibit their superiority.