Identification and Bilinear Control of Grade Change Operation in Paper Mills

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In this work the bilinear model predictive control method is applied to control the grade change operations in paper production plants. Because of the high nonlinearity of the grade change processes control of the grade change operations has been performed manually by experienced engineers in the plants. In some cases the bilinear model can be very effective to represent nonlinear processes. In this study the bilinear model for the paper plants is identified first. It is found that the bilinear model tracks the plant without significant discrepancy. Based on the multivariable bilinear plant model the optimal input variables are computed using the one-step ahead prediction method. Even for frequent changes in paper grades the bilinear model predictive control scheme exhibits good control performance.