

Title            Process control based on principal component analysis for maize drying  
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### **Abstract**

Producing the grain with equilibrium moisture content is an important process control objective. However, achieving this objective can be very difficult in grain drying process because of its multi-variables, nonlinearity and long delay. In this paper, a control approach based on principal component analysis (PCA) is presented to achieve this objective. A PCA model which incorporates time lagged variables is used, and the control objective is expressed in the score space of this PCA model. A controller is designed in the model predictive control framework, and it is used to control the equivalent score space representation of the process. The score predictive model for the model predictive control algorithm is built using neural network partial least squares (NNPLS). The process control system with NNPLS was tested on a commercial mixed-flow dryer and showed excellent accuracy and stability.