Abstract

The grain drying process is difficult to control because of its non-linearity and long delay. In this series of three papers, a model-predictive controller specially designed for the grain drying process is presented. Part 1 describes the development of a distributed-parameter process model based on the fundamental laws of simultaneous heat and mass transfer. The model is simpler than the general-purpose grain drying model; but it is more comprehensive and better in representing the non-linearity of the process than previously developed lumped parameter process models, and therefore is the preferred choice as the process model in a dryer controller. The control algorithm and field testing of the controller are covered in Parts 2 and 3, respectively.