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Ali Kemal Unver* (ali.unver@asu.edu), Department of Mathematics, Arizona State University, Tempe, AZ 85287-1804, and **Christian Ringhofer**. *Estimating Transport Coefficients in Re-entrant Factory Models*. Preliminary report.

We propose to develop continuum models of re-entrant factory production that treat the flow of products in analogy to traffic flow. Specifically, we model the dynamics of material flow via hyperbolic and parabolic conservation laws. The main variables used for modelling are the density and flux of the product in the factory. We first extract the transport coefficients, in particular, velocity and diffusion coefficients of the particles in the production system from a discrete event simulation (DES). Then we model the manufacturing system using a partial differential equation (PDE) with diffusion. PDE - conservation laws are successfully used for modeling the dynamical behavior of highway traffic in the theory of traffic simulation and control. Traffic models show good correspondence with manufacturing systems (vehicles = products, highway = manufacturing system). Therefore PDEs can also be useful in modeling of manufacturing systems. The specifics of the production process will enter into a state equation relating the velocity and diffusion of the product to the density of the material in the factory. The resulting nonlinear hyperbolic conservation law model allows fast and accurate simulations. (Received July 09, 2007)