

## **Fill rate and discrete ready rate approximations for perishable items in retail stores**

Rob Broekmeulen, Karel van Donselaar

*Eindhoven University of Technology*

In this talk we present approximations for the product availability for perishable items in supermarkets. We define product availability in two ways: a fill rate (percentage of demand which could be sold from inventory on the shelf) and a discrete ready rate (probability of having positive inventory on the shelf at the worst moment, i.e. just before a new potential delivery). We assume a lost sales system with positive lead time, a fixed case pack size, a fixed shelf life and stochastic demand.

The new approximations are developed for two types of inventory replenishment policy: a stock-based policy and a stock-age dependent policy. The new approximations build on an existing approximation for non-perishables in lost sales systems developed by Hill and Johansen (2006). Simulation and regression are used to develop and test the new approximations for product availability.

We show that the fill rate for the stock-age dependent policy is virtually independent of the shelf life. The fill rate for the stock-based policy considers the impact of outdating and hence it is dependent on the shelf life. For the stock-age dependent policy a simple linear relationship exists between the fill rate and the discrete ready rate.