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## ON ANALYSING DEMAND AND MAKING INVENTORY DECISIONS

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**Abstract** – The questions of when to place an order for additional stock and how large a quantity to order have attracted a lot of interest in the statistical literature. In this paper, some of the inventory decision models that have been proposed with the aim of providing answers to these questions are discussed. A characteristic that all of the models considered have in common is that they regard the demand for the item as a random variable. The focus is on the case of heterogeneous demand. In particular, the first three models employ a Bayesian approach for forecast and probability revisions in the case of a heterogeneous Poisson demand. The forecasts are then incorporated into a model that determines the best order quantity. The next two models assume that the lead-time is also a random variable and determine the stock level at which to reorder when the distribution of demand is the Yule. Finally, considering that the joint distribution of the aggregate demand in two successive time periods is of a generalized Waring form, the density of the distribution of the summand variables is numerically estimated.

**Keywords and Phrases** – inventory decision models, heterogeneous Poisson demands, order quantity, reorder point, bivariate generalized Waring distribution.