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**Kurt Helmes, Richard H Stockbridge and Chao Zhu\*** (zhu@uwm.edu), Department of Mathematical Sciences, University of Wisconsin-Milwaukee, Milwaukee, WI 53201. *On Optimal Ergodic Continuous Inventory Control Problems.*

This work examines a control problem when, in the absence of ordering, the single-item inventory process has continuous sample paths. The inventory process is modeled by a one-dimensional diffusion on some interval in which the left boundary is attracting, so as to capture the effect that demand tends to decrease the inventory level, and the right boundary is non-attracting. Orders instantaneously increase the inventory level and incur both positive fixed and level dependent costs. In addition, state-dependent holding/backorder costs are incurred continuously. The manager's influence on the inventory is limited solely to ordering policies that increase the current level. The objective of the manager is to find an ordering policy that minimizes the long-term average holding/backorder and ordering cost.

This work provides minimal conditions on the model which imply that an optimal ordering policy exists in the class of  $(s, S)$ -ordering policies. Examination of the steady state behavior of  $(s, S)$  policies leads to a two-dimensional nonlinear optimization problem for which a pair of optimizers establishes the levels for an optimal  $(s, S)$  policy. This paper's contribution is a set of very mild sufficient conditions for the existence of an optimal  $(s, S)$ -ordering policy. (Received January 05, 2015)