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**Edward Allen\*** ([edward.allen@ttu.edu](mailto:edward.allen@ttu.edu)), Department of Mathematics and Statistics, Texas Tech University, Lubbock, TX 79363-1042. *Modeling Environmental Variability With Mean-Reverting Processes.*

Environmental variability is often treated by modifying the parameters in a mathematical model. In the present investigation, two common methods to incorporate the effects of environmental variability in stochastic differential equation models are studied. The first approach hypothesizes that the parameter satisfies a mean-reverting stochastic process. The second approach hypothesizes that the parameter is a linear function of Gaussian white noise. The two approaches are discussed and compared analytically and computationally. Properties of several mean-reverting processes are compared with respect to nonnegativity and their asymptotic stationary behavior. The effects of different environmental variability assumptions on population size and persistence time for simple population models are studied and compared. In addition, environmental data are examined for a gold mining stock. It is concluded that mean-reverting processes possess several advantages over linear functions of white noise in modifying parameters for environmental variability. (Received August 31, 2014)