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**David Lipshutz\*** ([dlipshut@math.ucsd.edu](mailto:dlipshut@math.ucsd.edu)), Department of Mathematics, University of California, San Diego, 9500 Gilman Drive, La Jolla, CA 92092, and **Ruth J. Williams** ([williams@stochastics.ucsd.edu](mailto:williams@stochastics.ucsd.edu)), Department of Mathematics, University of California, San Diego, 9500 Gilman Drive, La Jolla, CA 92092. *On Slowly Oscillating Periodic Solutions of Delay Differential Equations with Non-negativity Constraints.*

Dynamical system models with delayed feedback, state constraints and small noise arise in a variety of applications in science and engineering. Under certain conditions oscillatory behavior has been observed. Here we consider a prototypical fluid model approximation for such a system — a one-dimensional delay differential equation with non-negativity constraints. We explore conditions for the existence and stability of slowly oscillating periodic solutions of such equations. We illustrate our findings with simple examples from internet rate control and gene regulation. (Received September 06, 2012)