1133-92-7 **Michael Malisoff*** (malisoff@lsu.edu), Department of Mathematics, Louisiana State University, 301 Lockett Hall, Field House Drive, Baton Rouge, LA 70803-4918. *Stability and Robustness Analysis for a Multispecies Chemostat Model with Delays in the Growth Rates and Uncertainties.*

The chemostat is a laboratory device and a mathematical model for the continuous culture of microorganisms. Chemostat models have been studied extensively, because of their importance in biotechnology and ecology. The well known competitive exclusion principle for chemostat models of multiple species competing for one limiting nutrient gives general conditions under which only one species persists. However, it is often observed in experiments that multiple competing species can persist in chemostats with one limiting substrate. Numerous methods have been developed to generate or explain coexistence in chemostats. For instance, Jean-Luc Gouze and Gonzalo Robledo provided sufficient conditions for coexistence of multiple species in chemostat models with one limiting substrate and with nonnegative constant species inputs. Here we study generalized versions of the Gouze-Robledo models with delays and uncertainties whose equilibria allow persistence of multiple species. We derive bounds on the delays that ensure asymptotic stability of the equilibria when the uncertainties are zero. Under delays and uncertainties, we provide bounds on the delays and on the uncertainties that ensure input-to-state stability of the equilibria. This work is joint with Frederic Mazenc and Gonzalo Robledo. (Received February 23, 2017)