

Stability and robustness analysis for a multispecies chemostat model with delays in the growth rates and uncertainties

Mazenc, Frederic

Robledo, Gonzalo

Malisoff, Michael

© 2018 American Institute of Mathematical Sciences. All rights reserved. We study a chemostat model with an arbitrary number of competing species, one substrate, and constant dilution rates. We allow delays in the growth rates and additive uncertainties. Using constant inputs of certain species, we derive bounds on the sizes of the delays that ensure asymptotic stability of an equilibrium when the uncertainties are zero, which can allow persistence of multiple species. Under delays and uncertainties, we provide bounds on the delays and on the uncertainties that ensure input-to-state stability with respect to uncertainties.