

1145-92-1468

**Nathan A Poppelreiter\*** ([nathan.poppelreiter@huskers.unl.edu](mailto:nathan.poppelreiter@huskers.unl.edu)). *Dynamic Observers for Unknown Populations.*

The concept of a dynamic observer is revisited in the context of population modeling. We describe their potential use for reconstructing population distributions for density-independent populations and a certain class of density-dependent populations, via dynamic measurements of the population. In the density-independent case, we show that these observers reconstruct the population faster than the state decays, and, in the density-dependent case, we show that this may or may not happen, although we give a guaranteed rate of convergence for the observer error to zero which is strictly less than a guaranteed rate of convergence of the population to a globally stable equilibrium. In both the density-dependent and -independent cases, we show, in several ecologically reasonable circumstances, that there is a natural, optimal construction of these observers. (Received September 22, 2018)