GAIL WOLKOWICZ, McMaster University, 1280 Main Street West, Hamilton, Ontario
Competition in the presence of a virus in an aquatic system

Recent research has determined that viruses are much more prevalent in aquatic environments than previously imagined. We derive a model of competition between two populations of bacteria for a single limiting nutrient in a chemostat where a virus is present. It is assumed that the virus can only infect one of the populations, the population that would be a more efficient consumer of the resource in a virus-free environment, in order to determine whether introduction of a virus can result in coexistence of the competing populations. Criteria for the global stability of the disease free and endemic steady states are obtained. It is also shown that it is possible to have multiple attracting endemic steady states, oscillatory behavior resulting from Hopf bifurcations, and a hysteresis effect. Mathematical tools that are used include Lyapunov functions, persistence theory, and bifurcation analysis.