1145-37-2259 **Lauren Lazarus*** (lauren.lazarus@trincoll.edu). *Frequency effects of various cubic resonances on a delayed oscillator.*

Limit cycle oscillations can be generated by a first-order delayed differential equation $\dot{x}(t) = -x(t-T) - x(t)^3$, which has been shown to have similar behaviors to the van der Pol oscillator and other standard models. This delayed system includes a cubic stiffening term which resonates with the linear terms and ensures that the periodic steady state is asymptotically stable when it exists. This talk will discuss some variations on the cubic term, including different combinations of delayed and instantaneous information about the system's state. Using perturbation methods and bifurcation theory, I will show that these differences affect both the natural frequency of the oscillator and its relative susceptibility to entrainment by an external periodic forcing. Parametric forcing in the form of a cubic resonance is also considered. (Received September 25, 2018)