

---

**XINGFU ZOU**, University of Western Ontario

*On the basins of attraction for a class of delay differential equations with non-monotone bistable nonlinearities*

We consider the delay differential equations (DDE)  $\dot{x}(t) = -g(x(t)) + f(x(t - \tau))$  which share the same equilibria with the corresponding ordinary differential equation (ODE)  $\dot{x}(t) = -g(x(t)) + f(x(t))$ . For the bistable case, both the DDE and ODE share three equilibria  $x_0 = 0 < x_1 < x_2$  with  $x_0$  and  $x_2$  being stable and  $x_1$  being unstable for the ODE. We are concerned with stability of these equilibria for the DDE and the basins of attraction of  $x_0$  and  $x_2$  when they are asymptotically stable for the DDE. Combining the idea of relating the dynamics of a map to the dynamics of a DDE with invariance arguments for the solution semiflow, we are able to characterize some subsets of basins of attraction of these equilibria for the DDE. In addition, existence of heteroclinic orbits are also explored. The general results are applied to a particular model equation describing the matured population of some species demonstrating the Allee effect.