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# Dynamics of the two-delay Belair-Mackey equation

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## Abstract

We study the dynamics of a differential equation with two delayed terms, representing a positive and a negative feedback, that was proposed by Bélair and Mackey for mammalian platelet production, and the same equation arises from three-stages single species populations as well. By combining various techniques, we prove delay dependent and absolute global stability results for the trivial and for the positive equilibrium, providing new mathematical results as well as novel insights for the related applications. We show that, somewhat surprisingly, the introduction of a removal term with fixed delay in population models can simplify the otherwise complex dynamics of the equation, and investigate the bifurcations created by such terms. This is a joint work with Alfonso Ruiz-Herrera and Hassan El-Morshedy.

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