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# Periodic solutions of a differential equation with a queueing delay

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## Abstract

We consider a differential equation with a state-dependent delay motivated by a queueing process. The state-dependent delay is a queueing delay, it is implicitly defined by the length of the queue. The length of the queue satisfies a discontinuous differential equation. We formulate a suitable framework for the problem, and prove existence, uniqueness and continuous dependence of the solutions. The main result guarantees the existence of slowly oscillating periodic solutions.

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