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**Title:** Periodic orbits of a neuron model with a periodic internal decay rate.

**Abstract:** It is our goal to study the existence of periodic solutions, existence of eventually periodic solutions and the study of boundedness nature of solutions depending on the relationship between the periodic terms of the sequence of our neuron model; in particular, it is our objective to study which particular periodic cycles of various periods will exist, the patterns of these periodic cycles and their stability character as well. Furthermore, we will investigate which particular periodic cycles of our neuron model can be eventually periodic. Moreover, we will consider the cases when unbounded solutions exist and their patterns as well.

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