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Periodic solutions for impulsive differential equations

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SUMMARY

The main objective of this talk is to present some results on the existence of periodic solutions for some impulsive differential equations problems.

Many evolution processes are characterized by the fact that they experience a sudden change in their state at certain moments of time. These changes can be assumed to occur instantaneously[1]. Mathematical models in aircraft control, population dynamics or in economy show impulsive effects [2].

Two different problems will be considered. Firstly, a first-order differential equations with the possible presence of singularities and impulses is studied. The impulses are assumed to happen on the position and at instants of time fixed beforehand. Under some easy-to-check hypotheses, the existence of positive and periodic solutions will be proved and some examples will be presented. Secondly, a second-order differential equations is considered with state-dependent impulses at both the position and its derivative. This means that the instants of impulsive effects depend on the solutions and they are not fixed beforehand, making the study of this problem more difficult. Once again, the existence of periodic solutions will be proved.

Keywords: impulsive differential equations, periodic solutions

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References

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