

NUMERICAL METHODS FOR OSCILLATORY DELAY DIFFERENTIAL EQUATIONS

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We consider oscillatory functional differential equations. The idea is to try to understand whether or not a numerical method applied to an oscillatory functional differential equation will give rise to a discrete scheme which is itself oscillatory.

In this talk we shall focus on a specific test problem that we know to be oscillatory. We apply a basic numerical method which leads to a discrete problem which may be tested for oscillatory behaviour by counting the number of zeros of an appropriate polynomial that lie on in the real axis.

The method we have employed is based on a numerical implementation of Rouché's Theorem and the Principle of the Argument. We are able to show by our computations that the oscillatory behaviour of the underlying problem is indeed replicated in the numerical scheme, for sufficiently small choice of the step-length h .