

## **Multivalued-multistage method for second-order ODEs**

### **ABSTRACT**

The aim of this paper is to generate the needed framework to develop order conditions for second-order Ordinary Differential Equations (ODEs) by class of multivalued-multistage Nystrom method. A general approach to study the order conditions of the methods for solving second-order initial value problems is investigated. Our investigation will be carried out by adapting the theory of Nystrom-series and using the sets of second order rooted trees for solving second-order ODEs which leads to a general set of order conditions. In this paper the method of order three using constant step-size algorithm is derived. The stability region of method is also proposed.

**Keyword:** Second-order ODEs; Multivalued-multistage method