THE METHOD OF SUCCESSIVE INTERPOLATIONS
SOLVING INITIAL VALUE PROBLEMS FOR SECOND ORDER FUNCTIONAL DIFFERENTIAL EQUATIONS

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Abstract. A new numerical method for initial value problems associated to second order functional differential equations is obtained. The method uses the fixed point technique, the trapezoidal quadrature rule, and a Birkhoff interpolation procedure. The convergence of the method is proved without smoothness conditions, the kernel function being only Lipschitzian in each argument. The interpolation procedure is used only on the points where the argument is modified. A stopping criterion of the algorithm is obtained and the accuracy of the method is illustrated on some numerical examples of pantograph type.

Key Words and Phrases: Functional differential equations of second order, fixed point technique, numerical method, Birkhoff interpolation.

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