Numerical solution of a singular Volterra integral equation

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ABSTRACT

We consider the following second kind Volterra integral equation

$$y(t) = \int_0^t K(t,s)\frac{s^{\mu-1}}{t^{\mu}}y(s)ds + g(t), \quad t \in [0,T], \tag{1}$$

where $\mu > 0$ and g is a given function. Several methods have been studied for the numerical treatment of (1) in the case $K(t,s) = 1$, namely certain classes of product integration methods based on interpolatory quadratures ([1], [4]) and collocation methods based on piecewise polynomial approximations ([3], [2]). In the present work we are concerned with the numerical solution of the general equation (1), where $K(t,s)$ is a smooth function. Some numerical examples are shown which illustrate the performance of the methods.

References

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