

A Nyström method for high order BVP in $[-1, 1]$

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We consider the following boundary value problem of order $2s$

$$\begin{cases} f^{(2s)}(x) + a(x)f(x) = g(x) \\ f^{(2i)}(\pm 1) = 0, \quad i = 0, \dots, s-1 \end{cases} \quad (1)$$

where g and a are known functions. We rewrite problem (1) as a system of s boundary value problems of the second order and, then, we reduce each problem to the equivalent Fredholm integral equation by applying a classical procedure.

Then we apply a Nyström method to solve the obtained system of integral equations. We prove that the procedure is stable and convergent. We show some numerical tests confirming our theoretical results.