

A numerical method for hypersingular integrals of the first kind

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Abstract

We derive an approximate solution for hypersingular integrals of the first kind. Chebyshev polynomials of the second kind are used to construct the interpolating polynomial. In turn, this polynomial approximates the crack opening displacement function of the density function. A collocation method is implemented, with the zeros of the Chebyshev polynomial of the first kind as the collocation points. As a result of these implementations, the whole integral equation is approximated by a system of algebraic equations which is mathematically tractable. The application and accuracy of the present method are illustrated with some relevant examples.

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