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**Distance transformation for the numerical evaluation of nearly singular integrals on triangular elements.** (English) [Zbl 1287.65124](#)

Eng. Anal. Bound. Elem. 37, No. 10, 1311-1317 (2013).

Summary: The accurate numerical evaluation of nearly singular boundary integrals is a major concerned issue in the implementation of the boundary element method (BEM). In this paper, the previous distance transformation method is extended into triangular elements both in polar and Cartesian coordinate systems. A new simple and efficient method using an approximate nearly singular point is proposed to deal with the case when the nearly singular point is located outside the element. In general, the results obtained using the polar coordinate system are superior to that in the Cartesian coordinate system when the nearly singular point is located inside the element. Besides, the accuracy of the results is influenced by the locations of the nearly singular point due to the special topology of triangular elements. However, when the nearly singular point is located outside the element, both the polar and Cartesian coordinate systems can get acceptable results.

**MSC:**

65N38 Boundary element methods for boundary value problems involving PDEs

Cited in 15 Documents

65D30 Numerical integration

**Keywords:**

boundary element method; nearly singular integrals; numerical integration; distance transformation; triangular element

**Full Text:** [DOI](#)

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