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Non-sinular MFS for Anisotropic Elasticity

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The purpose of the present paper is development of a Non-singular Method of Fundamental Solutions (NMFS) for two-dimensional anisotropic linear elasticity problems. The NMFS is based on the classical Method of Fundamental Solutions (MFS) with regularization of the singularities. This is achieved by replacement of the concentrated point sources by distributed sources over circles around the singularity. The anisotropic fundamental solution is employed in collocation of the governing plane strain force balance equations. In case of the displacement boundary conditions, the values of distributed sources are calculated directly and analytically. In case of traction boundary conditions, the respective desingularized values of the derivatives of the fundamental solution in the coordinate directions, as required in the calculations, are calculated indirectly from the considerations of two reference solutions of the linearly varying simple displacement fields. Several numerical examples, including multi-body problems, are shown.

Keywords: anisotropic elasticity, plane strain, Navier's equation, displacement and traction, non-singular MFS