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Effect of Inclusions on the Shape and Size of Crack Tip Plastic Zones by Element Free Galerkin Method

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Abstract : The present study investigates the effect of inclusions on the shape and size of crack tip plastic zones in engineering materials subjected to static loads by employing the element free Galerkin method (EFGM). The modeling of the discontinuities produced by cracks and inclusions becomes independent of the grid chosen for analysis. The standard displacement approximation is modified by adding additional enrichment functions, which introduce the effects of different discontinuities into the formulation. The level set method has been used to represent different discontinuities present in the domain. The effect of inclusions on the extent of crack tip plastic zones is investigated by solving some numerical problems by the EFGM.

Keywords : EFGM, stress intensity factors, crack tip plastic zones, inclusions
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