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# On the approximation in the smoothed finite element method (SFEM)

Stephane PA Bordas, Sundararajan Natarajan

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This letter aims at resolving the issues raised in the recent short communication [1] and answered by [2] by proposing a systematic approximation scheme based on non-mapped shape functions, which both allows to fully exploit the unique advantages of the smoothed finite element method (SFEM) [3, 4, 5, 6, 7, 8, 9] and resolve the existence, linearity and positivity deficiencies pointed out in [1]. We show that Wachspress interpolants [10] computed in the physical coordinate system are very well suited to the SFEM, especially when elements are heavily distorted (obtuse interior angles). The proposed approximation leads to results which are almost identical to those of the SFEM initially proposed in [3]. These results that the proposed approximation scheme forms a strong and rigorous basis for construction of smoothed finite element methods.

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