A CONTINUOUS/DISCONTINUOUS GALERKIN METHOD FOR GRADIENT DAMAGE MODELS

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A Continuous/Discontinuous Galerkin (C/DG) Method has been developed for gradient damage. The strength of this class of methods lies in the fact that they allow the use of C^0 interpolation functions for continuum theories involving higher-order derivatives. This is in contrast with the more traditional approach with at least C^1 continuous interpolations or mixed methods. Given the well-known difficulties with those methods, Continuous/Discontinuous Galerkin Methods offer an attractive alternative for engineering computations. The advent of these methods also obviates the need for a reformulation of certain gradient damage models into an "implicit" gradient form. The C/DG formulation involves stabilization terms in the weak form, which is fully-equivalent to the strong form of the problem if sufficiently-smooth interpolations are employed. When the degree of continuity is lowered, jump conditions arise at element edges, and are imposed weakly. The Method will be discussed and numerical examples presented for boundary value problems with a gradient damage theory.