

Composite Finite Elements for Cellular solids

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A bridging domain method to couple a structural beam model with a Finite Element model is presented. Two techniques are studied: The Lagrangian method is based on Lagrange Multipliers and the Augmented Lagrangian method uses a penalty term. Both methods are implemented and tested with several numerical experiments. In the static case, the coupled model reproduces analytical solutions with high accuracy. For dynamic (i.e. time dependent) simulations the coupled model gives reasonable results but is clearly outperformed by the pure coarse/fine grain models. Thereby the presented method is with certainty a method of choice for the simulation of crack propagation.

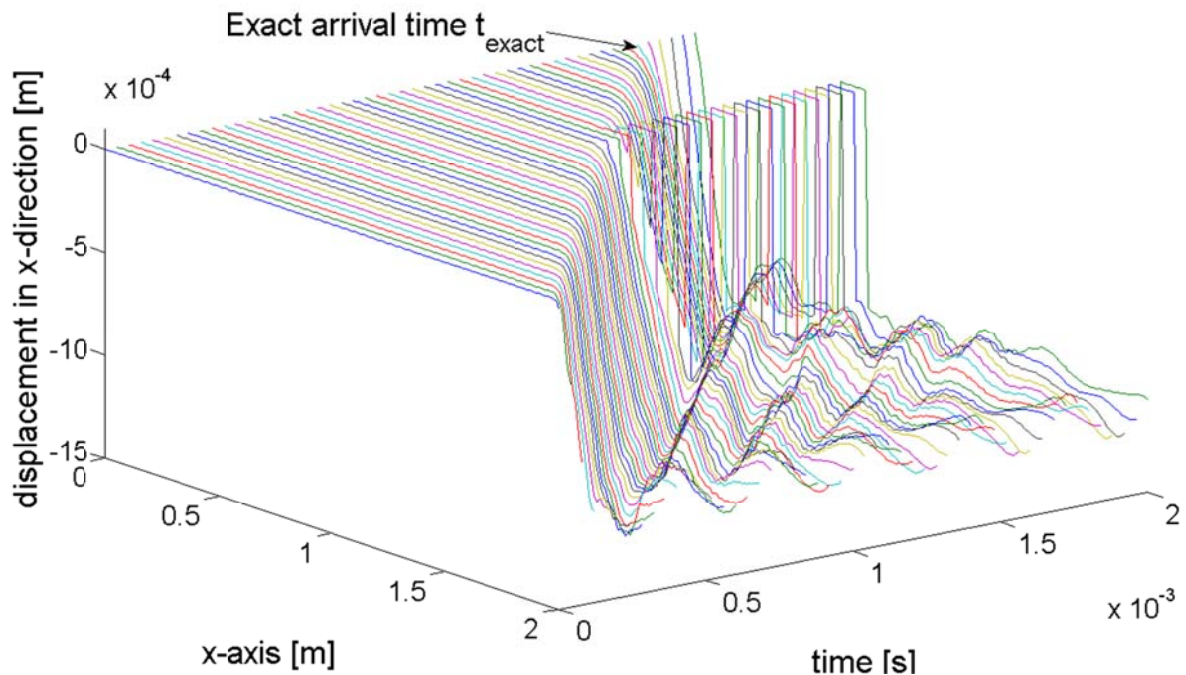


Figure: A pulse propagating through the coupled model. Only the displacement in x-direction along the middle axis of the FE model is shown.