SIMULATION OF LOCAL INELASTIC BEHAVIOR IN LARGE SCALE DYNAMICS ANALYSIS

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Presented here is an extension of the Domain Reduction Method (cf. Bielak et al. [1]) to incorporate simulations of local inelastic behavior in dynamic analysis. To this end, the extended method is called Plastic Bowl Method (PBM), which allows for significant reduction in the computational effort if the extent of inelastic zone is known a-priori. The method is quite general in that it can handle any kind of inelastic behavior that is spatially restricted to the inside of so-called plastic bowl.

The application of the PBM in the area of earthquake engineering is shown in a number of examples. In particular, examples of seismic soil structure interaction and local site response are presented within a more general framework of elastic-plastic wave propagation simulations using PBM. Application of PBM to other areas of dynamic wave propagation with localized inelastic deformation is discussed as well.

References

[1] Bielak, J., Loukakis, K., Hisada, Y., and Yoshimura, C. Domain reduction method for three-dimensional earthquake modeling in localized regions. part I: Theory. *Bulleting of the Seismological Society of America* (2001). PrePrint.