Research Objectives

- Develop the potential-based constitutive model for mixed-mode cohesive zone modeling
- Employ the extrinsic cohesive zone model for dynamic fracture and branching problems
- Develop systematic adaptive mesh refinement and coarsening (AMR+C) schemes for dynamic cohesive fracture simulation
- Employ adaptive topological operators such as nodal perturbation, edge-swap, edge-split and vertex removal

Adaptive Topological Operators

- Nodal Perturbation
- Edge-Swap
- Edge-Split
- Vertex-Removal (or Edge-collapse)

Mixed-Mode Crack Propagation (cont.)

Conclusions

- The potential-based constitutive model with adaptive operators (nodal perturbation, edge-swap, edge-split, and vertex-removal) leads to an effective and efficient computational framework to simulate physical phenomena associated with fracture.
- The computational results of the adaptive mesh refinement and coarsening is consistent with the results of the uniform mesh refinement.

Acknowledgement

- US National Congress on Computational Mechanics (USNCCM) for travel award
- National Science Foundation (NSF) under Research Grant Number CMMI 0800805

References