A Quick Overview of Gemini/NES/NESM Status and Future Work

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Gemini and NESM or NES

Gemini 3D Hydrodynamics Code:

    1. Determines the forces generated from a high energy event.

    2. Uses dynamic surface displacements and velocities.

    3. Produces surface forces for coupling.

NESM Code:

    1. Determines the velocity response of a solid under shock.

    2. Uses dynamic surface forces.

    3. Produces surface displacements and velocities for coupling.

NES Code:

    1. Determines the frequency response of a solid under shock.

    2. Uses dynamic surface forces.

    3. Produces surface displacements and velocities for coupling.

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Gemini/NESM/NES Coupling Capabilities

- **Gemini/NESM/NES Fully Coupled:** Gemini forces passed to NESM/NES, NESM/NES displacements and velocities passed to Gemini.

- **Multiple Executables:** Gemini is run as a separate executable from NES/NESM.

- **File Based Communication:** Uses Gemini file based communication routines. Can be extended to MPI or sockets.

- **Triangular Shells:** Added a triangular shell element for explicit dynamics in NESM.

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Gemini/Sierra Mechanics Coupling Cont.

- **Subcycling of NES/NESM:** When Gemini timestep exceeds NES/NESM timestep. Prompted development of explicit solve in NES.

- **Hex or Shell:** Sierra can use hex or shell elements.

- **Interface Mesh if Needed:** Possible to define a surface mesh for Gemini and interpolate the forces to a NES/NESM mesh. Useful during replay.

- **Parallel Gemini/Parallel NES/NESM:** Gemini/NES/NESM each run on multiple processors. Beta Testing

Gemini/Sierra Mechanics Extensions

- **Element Death:** Extend Gemini/NESM to collect the element death information for communication to Gemini.

- **Explicit Solver For Salinas:** Extend NES by implementing an explicit solver.

- **MPI and Sockets:** Use MPI or socket based communication.

- **NASGEN Translator:** Needs additional work to be robust, especially for NESM.

- **MESM Work:** Need to handle the translator robustly, especially for beam and point mass.