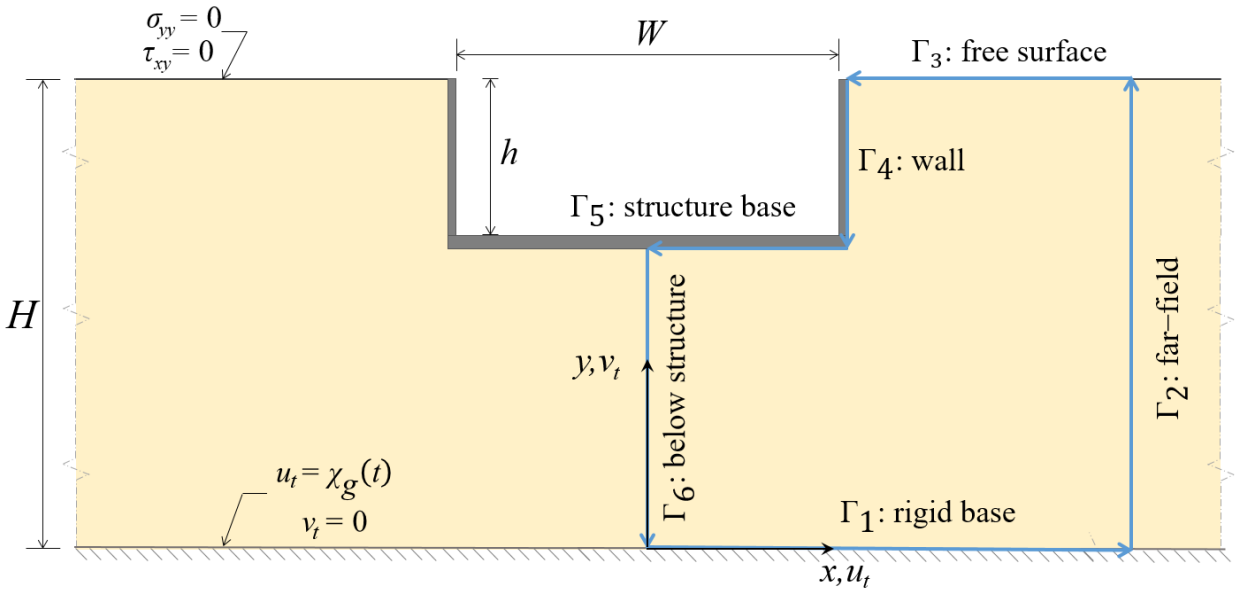
Ph.D. Thesis Defense



Application of Path-independent Integrals to Soil-structure Interaction

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Venue: Gates-Thomas Laboratory 135, September 27th at 10am

Assessing seismic pressure increment on buried structures is a critical step in the design of infrastructure in earthquake-prone areas. Due to intrinsic complexities derived from the need to match the solution in the far-field to the localized solution around the structure, the near-field, researchers have aimed at finding simplified models focused on engineering variables as the seismic earth thrust. One such model is the so-called Younan-Veletsos model, which pivots on a stringent assumption on the stress tensor. We present the first derivation of the exact solution of this problem, which is later analyzed to reveal phenomena not captured by current approximate solutions. Then, we introduce a novel model which relies on the path-independent Rice's J-integral, a customary tool in Fracture Mechanics, which is applied here in the Soil-structure Interaction context for the first time. This novel model captures those features of the exact solution that were missed by prior approximations.