Modeling masonry structures through rigid bodies and deformable interfaces

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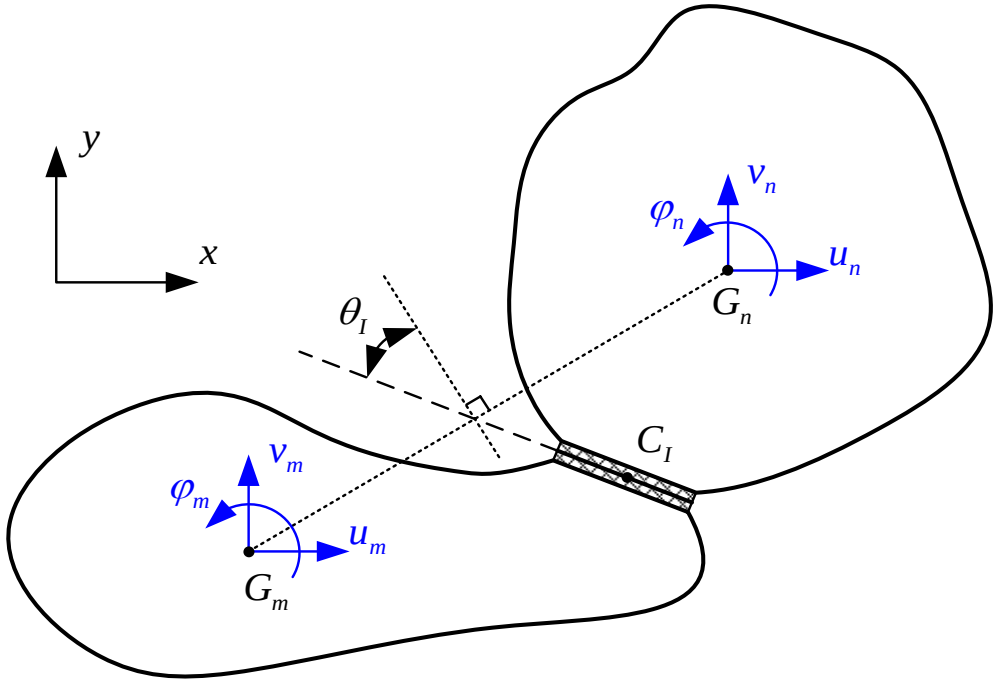
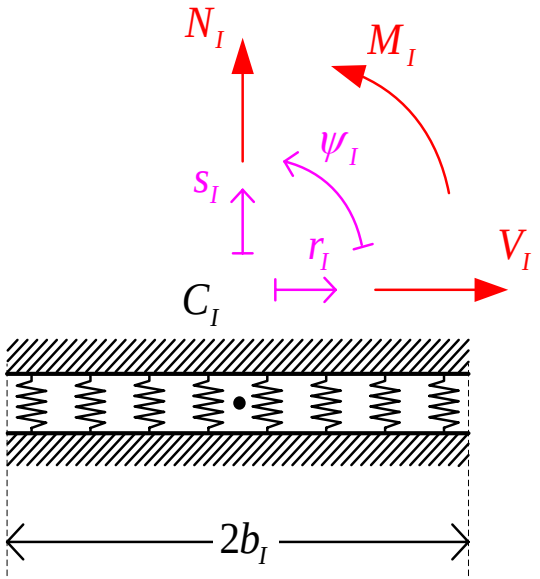
Discrete model

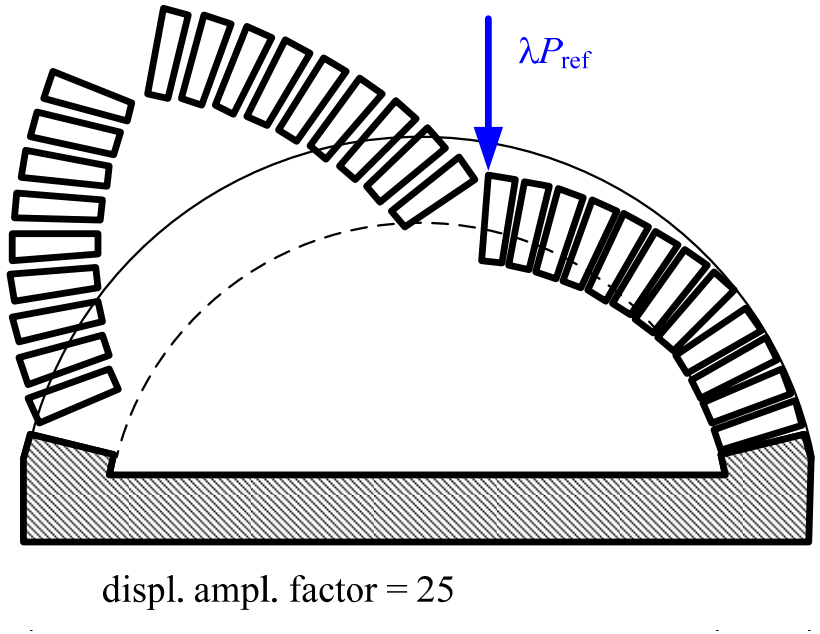
Assumptions:

- Rigid bodies joined by deformable interfaces
- Normal interactions: cushions of no-tensile springs
- Shear interactions: Coulomb non-associated plasticity
- Co-rotational approach (large displacements of blocks, small deformations of interfaces)

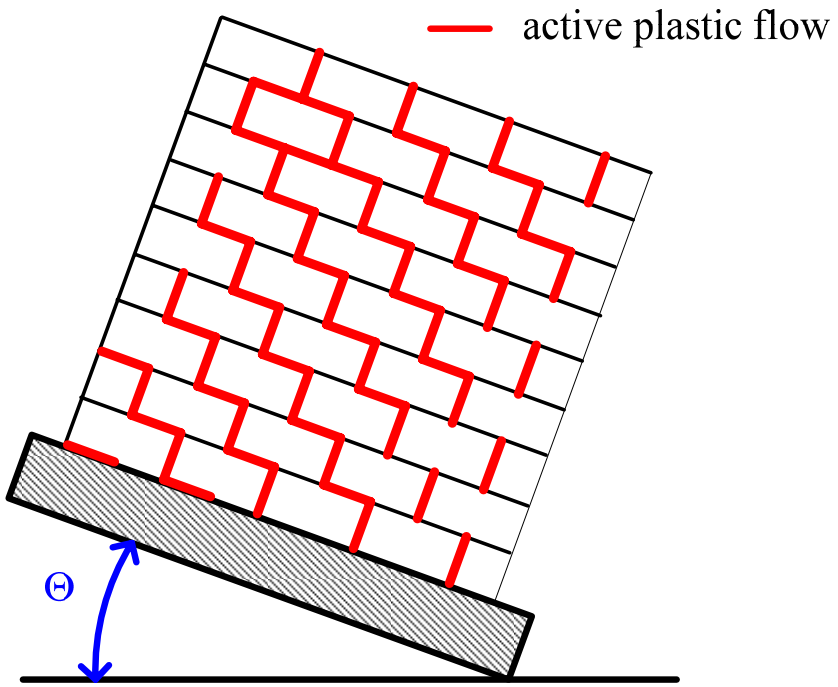




Application to discretized and discrete structures



Convergence to theoretical results for rigid no-tensile material



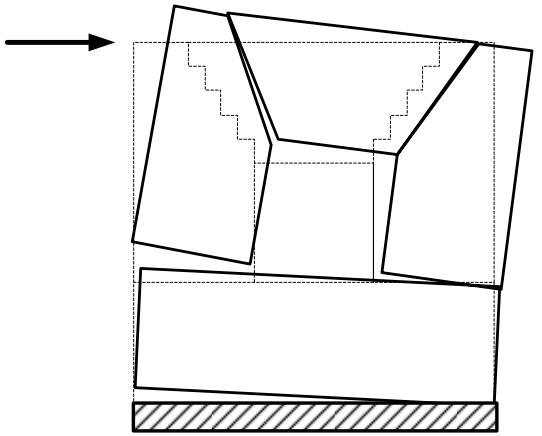
Numerical results in agreement (-4%) with experimental tests

The robustness of the method with respect to the model parameters has been studied

[L. Salvatori, P. Spinelli, *submitted*]

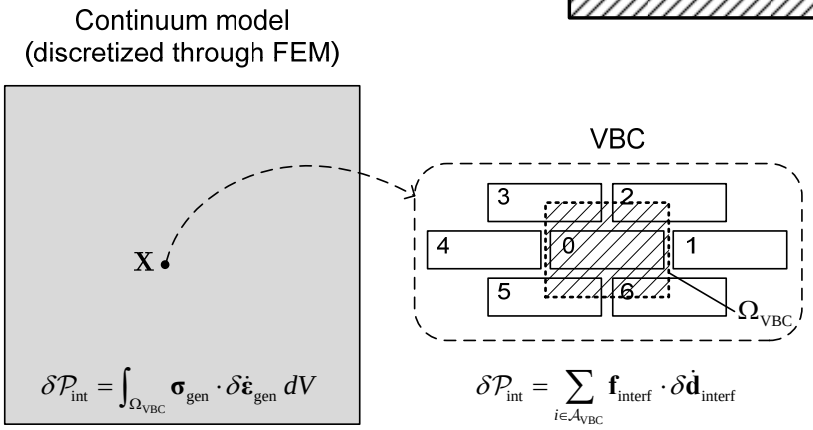
Ongoing research

- Application to large displacements and dynamics



- Definition of suitable interfaces for discrete macro-modeling of walls

- Homogenization and concurrent multi-scale modeling



in cooperation with P. Spinelli and W. K. Liu