



# Improved prediction step for Newmark integration of nonlinear systems

## Semester Thesis/IDP/Master's Thesis

The Newmark algorithm and its refinement (HHT, Generalized- $\alpha$ ) are popular numerical time integration methods for the equations of motion of structural dynamics. They are conveniently casted as predictor-corrector schemes. For linear systems, one correction step suffices for any consistent prediction. In contrast, for nonlinear systems, several iterations of the correction step are often necessary and the performance of the algorithm may depend significantly on the prediction step. In particular, the performance could be improved significantly by a better prediction step. In this project, the student will develop, implement (in Python or in Matlab) and compare different prediction strategies towards the improvement of the algorithm performance.

**Topics** • Numerical integration • Structural dynamics

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