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Arc-Length Method for Explicit Dynamic Relaxation

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The work comprises the procedure adopted to combine the arc-length method and the iterative dynamic relaxation technique. The resulting method has been successfully applied to simulate the quasi-static propagation of buckles in cylindrical shells under external pressure. The method developed is an explicit solver that can be used to trace convolute load-deflections paths for unstable structures, handling “snap-through” or “snap-back” problems. The solver is also capable to overcome limit points, when complex roots may occur, and a valid solution can not be obtained. The dynamic relaxation technique is very attractive for problems with highly nonlinear geometric and material behavior. The method described can also be adapted to others explicit vector iteration solvers.

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