

**concrete plasticity model with elliptic failure surface and independent
hardening/softening**

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Abstract: A plasticity-based concrete model is proposed. The failure surface is elliptic in the σ - τ stress space. Independent hardening as well as softening is assumed in tension, compression, and shear. The nonlinear inelastic action initiates from the origin in the σ - ϵ (τ - v) diagram. Several parameters are incorporated to control hardening/softening regions. The model is incorporated into a nonlinear finite element program along with other classical models. Several examples are solved and the results are compared with experimental data and other failure criteria. 'Reasonable results' and stable solutions are obtained for different types of reinforced concrete oriented structures.