

Nonlinear viscous damping

[Link](#) objects are very well suited for modeling the **nonlinear** force-velocity relationship of **viscous damping**. The damping properties of [nonlinear](#) viscous dampers are based on the Maxwell model of viscoelasticity (Malvern, 1969), and may be specified for each deformational degree-of-freedom (DOF). Those DOF without nonlinear specification will remain linear by using effective stiffness, which may be zero. Additional information is available in the [CSI Analysis Reference Manual](#) (Chapter XV The Link/Support Element, Nonlinear Viscous Damper Property).

Two sets of properties are available to [dampers](#), including:

- **Linear properties**, where Effective Stiffness and Effective Damping may be specified for linear analysis [cases](#). By default, these parameters are modeled in parallel.
- **Nonlinear properties**, where Stiffness, Damping Coefficient, and Damping Exponent are specified, and modeled in series. A linear link object is most suitable unless nonlinear damping is assigned using a Damping Exponent other than 1.0. This enables the modeling of a linear dashpot in parallel with linear stiffness for both linear and nonlinear analysis cases.