SIMPLE VISCOELASTIC MODEL

This model contains two parameters: normal spring coefficient k_n and damping parameter μ.

Velocities:

$$\bar{v}_{rel} = \bar{v}_2 - \bar{v}_1$$

$$\bar{v}_{rel,n} = \bar{r}_n \cdot (\bar{r}_n \cdot \bar{v}_{rel})$$

Normal force:

$$\bar{F}_n = -\bar{r}_n \cdot \xi_n \cdot k_n - \bar{r}_n \cdot sgn(\bar{v}_{rel,n} \cdot \bar{r}_n) \cdot \mu \cdot |\bar{v}_{rel,n}|$$

Summarized forces and moments acting on particle (wall):

$$\bar{F}_{tot} = \bar{F}_n + \bar{F}_t$$

$$\bar{F}_1 = \bar{F}_n + \bar{F}_t$$

$$\bar{F}_2 = -\bar{F}_n - \bar{F}_t$$

Symbol	Description
$\bar{F}_n$	Force in normal and tangential directions [N]
$\bar{v}_{rel}$	Relative velocity [m/s]
$\bar{v}_1, \bar{v}_2$	Translational velocities of contact partners [m/s]
$\bar{r}_c$	Contact vector [m]
$\bar{r}_n$	Normalized contact vector [-]
ξ_n	Normal overlap [m]