Identification of material property: Hardness (65), Damping (Small)

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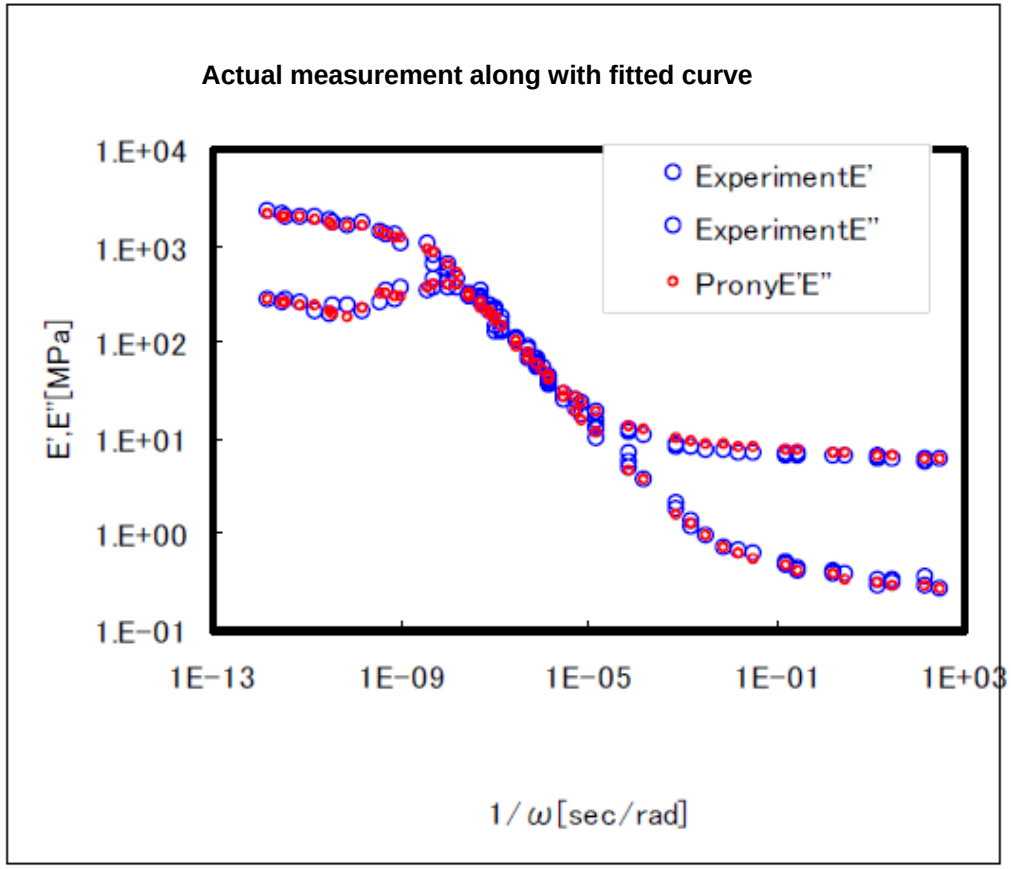
Prony series

$$G(\tau) = G_0\left\{1 - \sum_{i=1}^{N} \bar{g}_i^P\left(1 - e^{-\tau/\tau_i^G}\right)\right\}, \quad K(\tau) = \infty$$

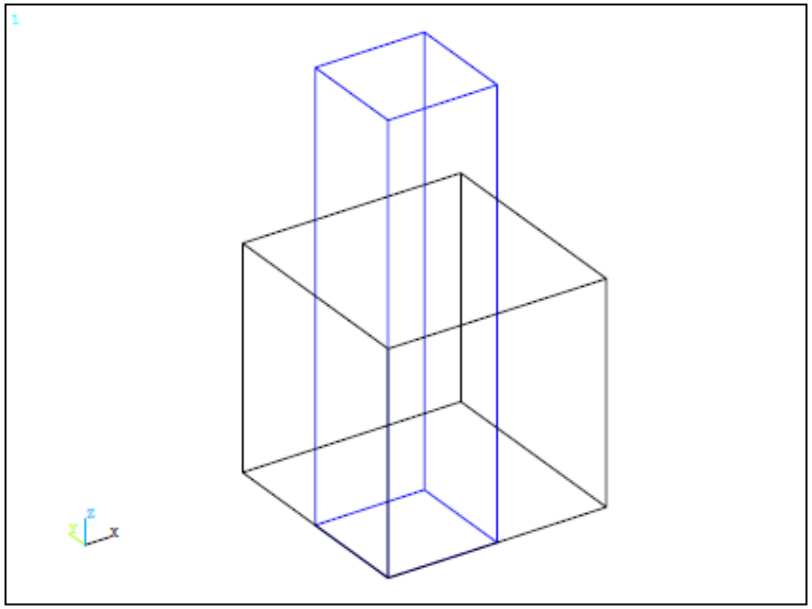
Young's Modulus[MPa]	Poisson's Ratio[-]
2.42684E+03	4.99000E-01
$\bar{g}_i^P$ [MPa]	τ_i^G [sec]
1.94209E-01	1.59155E-12
1.43905E-01	1.59155E-11
1.94232E-01	3.97887E-10
1.66321E-01	3.97887E-09
2.09840E-01	1.59155E-08
6.78500E-02	1.59155E-07
1.37918E-02	1.59155E-06
4.20637E-03	1.59155E-05
1.57138E-03	1.59155E-04
5.16226E-04	1.59155E-03
3.28406E-04	1.59155E-02
2.57402E-04	1.59155E-01
2.12828E-04	1.591549431
1.73326E-04	15.91549431
1.54568E-04	159.1549431
2.04466E-04	1591.549431



Hardness (65), Damping (Small)
Stress-relaxation analysis : mat1_hs65_relax_ansys.dat

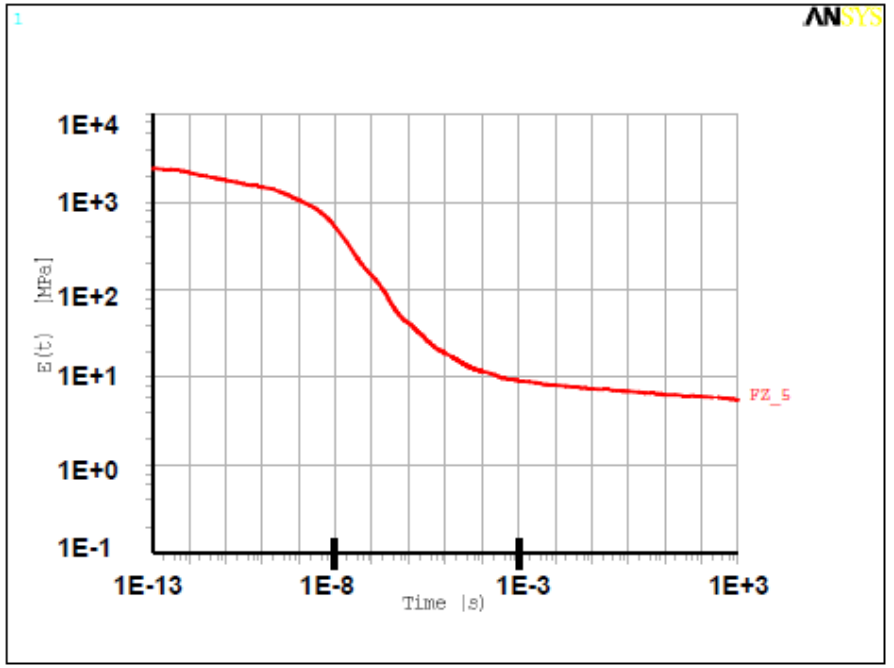
Japan Association for Nonlinear CAE

ANSYS 10.0



Hexahedron (1mmx1mmx1mm)
Keeping 1mm enforced displacement

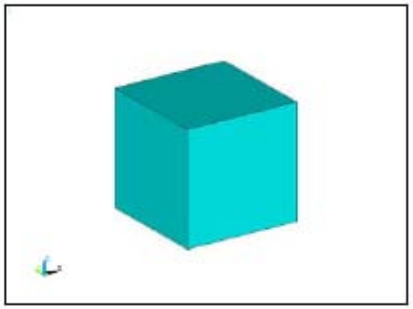
Analysis model

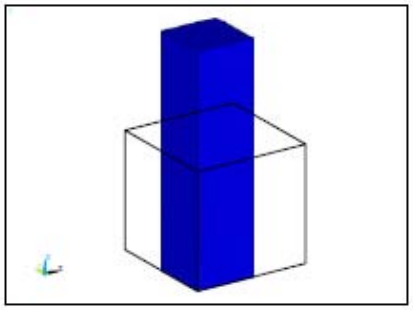


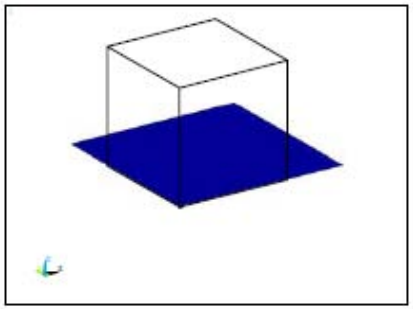
Stress-relaxation curve

Harmonic vibration analysis (mat1_hs65_freq_ansys.dat)
Hardness (65), Damping (Small)

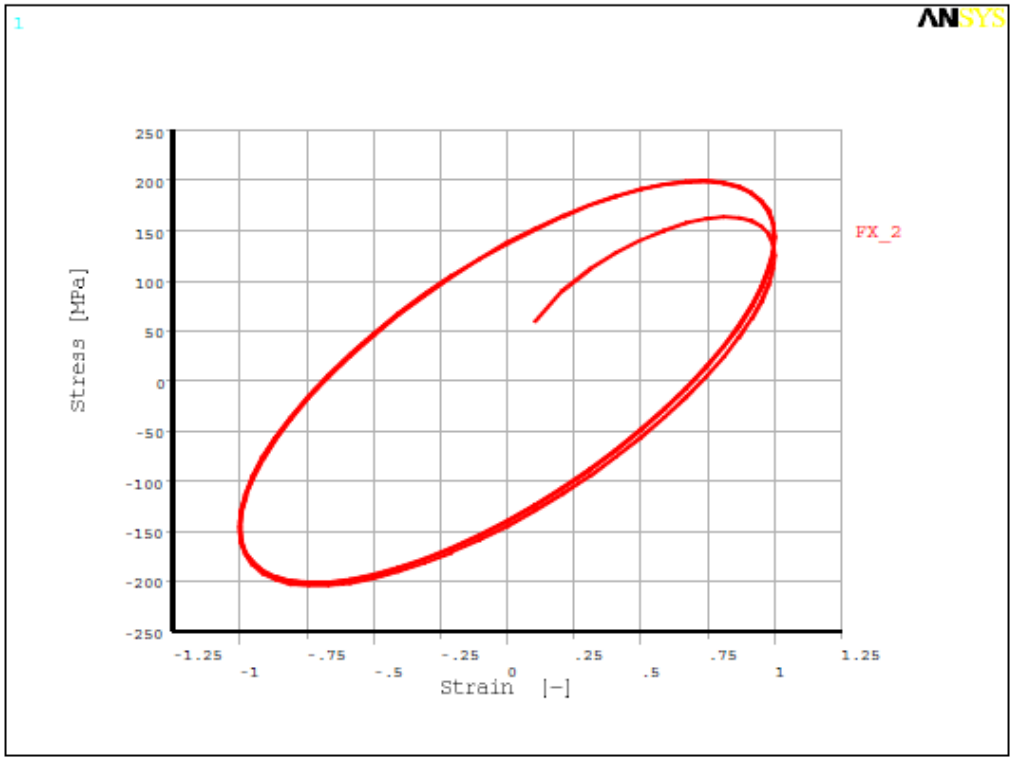
ANSYS 10.0







Analysis model



Amplitude A :
Frequency f=10^6Hz
Displacement δ= Asin2 πf

10^6Hz hysteresis curve