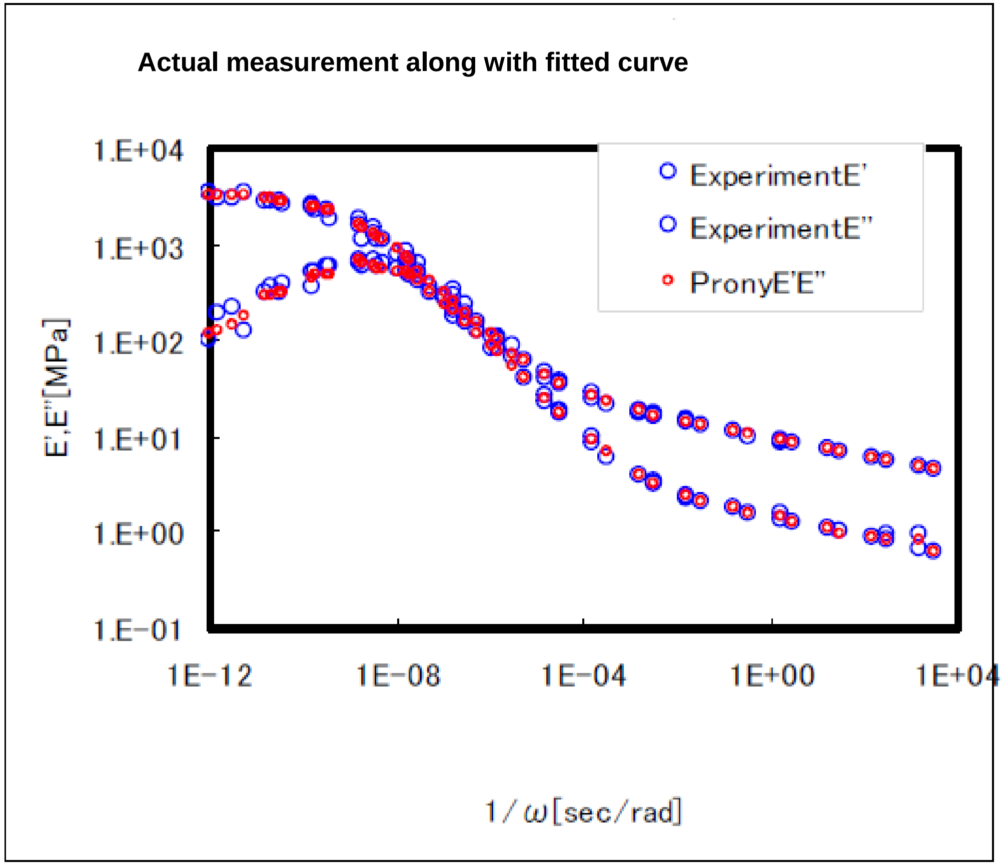
Identification of material property: Hardness (50), Damping (Large)

ANSYS 10.0

Young's Modulus[MPa]	Poisson's Ratio[-]
3.36101E+03	4.99000E-01
$\overline{g}_i^P$ [MPa]	τ_i^G [sec]
5.05514E-02	1.06103E-12
1.17999E-01	1.59155E-11
1.85315E-01	1.59155E-10
3.10060E-01	1.59155E-09
2.26954E-01	1.59155E-08
6.67971E-02	1.59155E-07
2.59849E-02	1.59155E-06
7.31704E-03	1.59155E-05
2.93189E-03	1.59155E-04
1.39904E-03	1.59155E-03
9.13070E-04	1.59155E-02
7.39379E-04	1.59155E-01
5.79082E-04	1.591549407
4.55188E-04	15.91549431
3.47859E-04	159.1549431
4.21064E-04	1591.549407

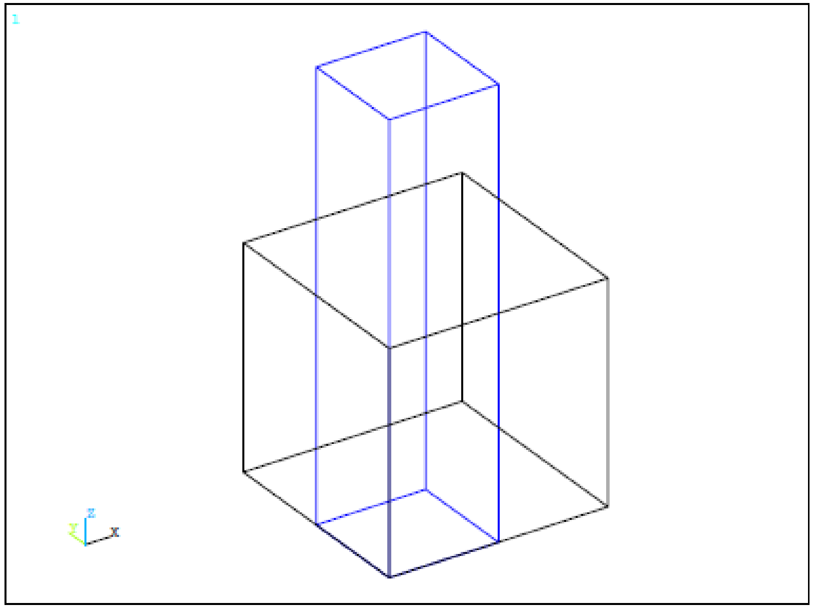
Prony series

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



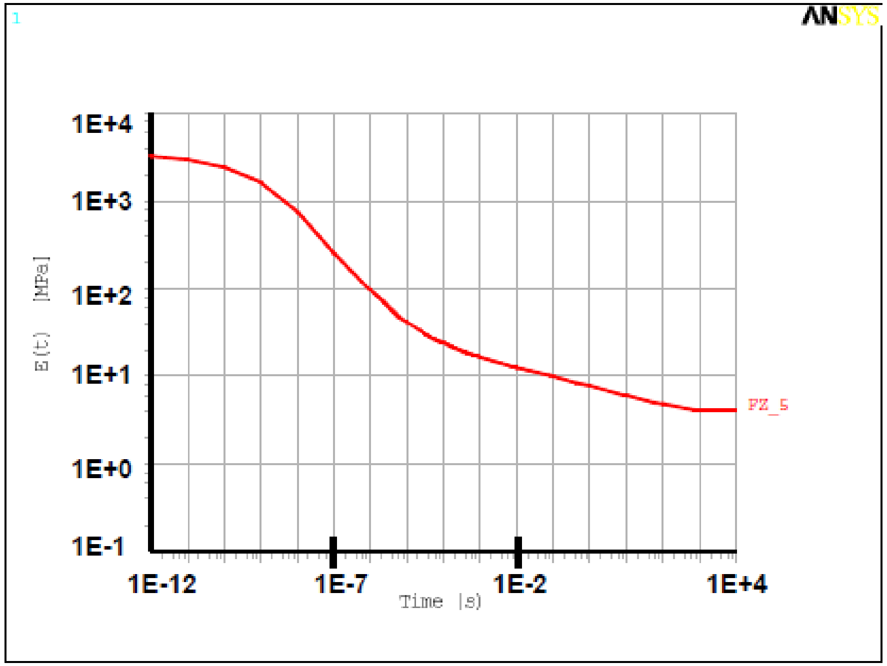
Stress-relaxation analysis : mat2_hs50_relax_ansys.dat
Hardness (50), Damping (Large)

ANSYS 10.0



Hexahedron (1mmx1mmx1mm)
Keeping 1mm enforced displacement

Analysis model

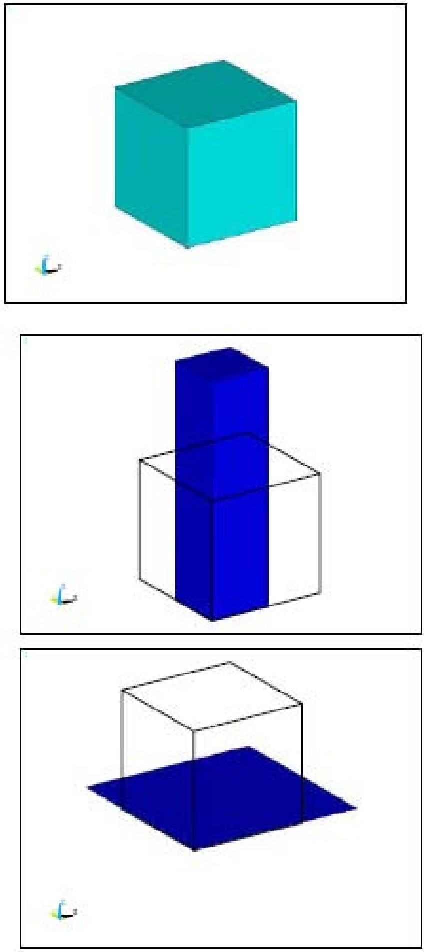


Stress-relaxation curve

Japan Association for Nonlinear CAE

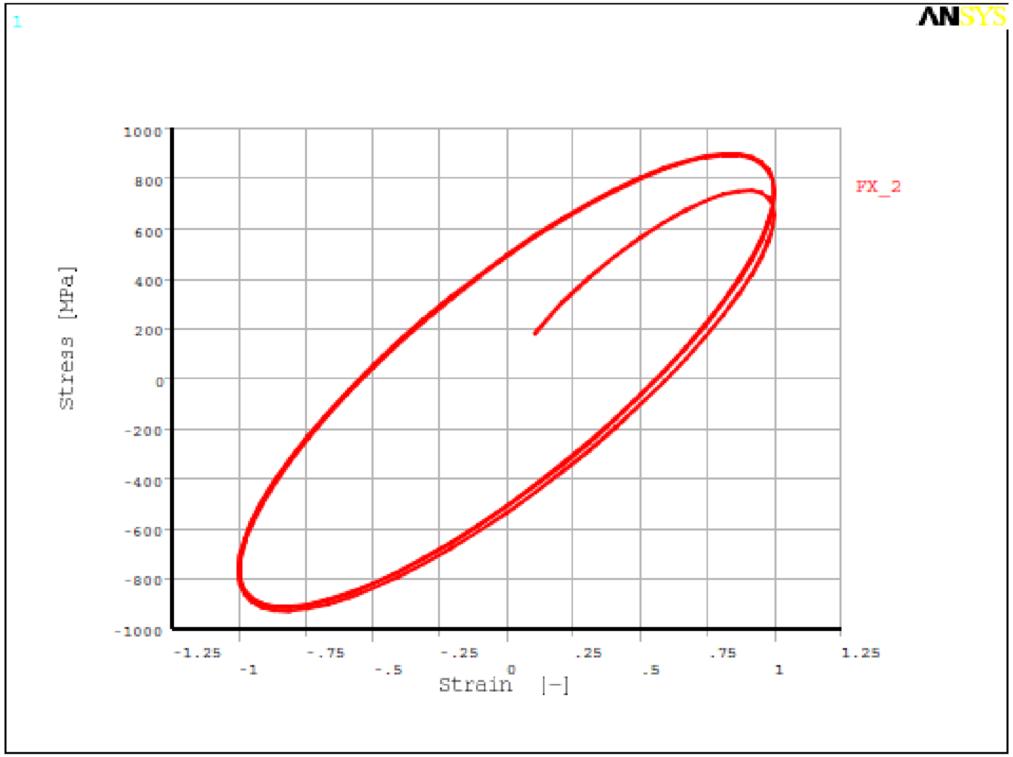
Harmonic vibration analysis (mat2_hs50_freq_ansys.dat)
Hardness (50), Damping (Large)

ANSYS 10.0



Analysis model

Amplitude A = 1mm
Frequency f=10^7Hz
Displacement δ= Asin2 πf



10^7Hz hysteresis curve