Mass Acceleration Curve and Mass Loading

English units

Mass entered in lbm, converted to consistent units: $m = W/386$ [lbf sec^2/in]

Stiffness k [lbf/in], length [in], force [lbf], acceleration [in/sec^2]

$1\,G = 386$ in/sec^2

Metric units

Mass m [kg], stiffness k [N/m], length [m], force [N]

$1\,G = 9.81$ m/sec^2

Mass acceleration curve (user-entered)

Between points: $n = n_1(m/m_1)^b$, $b = \ln(n_2/n_1)/\ln(m_2/m_1)$; early MACs: $n \propto 1/\sqrt{m}$

Component load: English F [lbf] $= m$ [lbm] $\times n$; metric F [N] $= 9.81\,m$ [kg] $\times n$

Modal MAC: $F = \sqrt{\sum_i (m_{eff,i}\, n(m_{eff,i}))^2} + n_{rb}\, m_{total}$

Mass loading (Irvine, Mass Loading Rev F)

English: $-3\ln(m/40\,\text{lbm})/\ln 2$ dB; metric: $-3\ln(m/18\,\text{kg})/\ln 2$ dB; PSD factor $10^{dB/10}$