

N.º 08

Rayleigh with a fixed β : every model in your database gets different damping

Copying the same damping coefficient into every model looks neutral, but it is not: a flexible structure ends up with 1.5% and a stiff one with 5%. I explain where that comes from and how to fix it.

1.

What damping is

It is what makes a swing stop on its own. In structures we express it as a percentage, ξ : usually between 2% and 5%.

2.

The Rayleigh trap

With stiffness-proportional damping only, $\xi = \beta \cdot \pi \cdot f$. The same β gives a different ξ to each structure.

3. Flexible vs stiff

1.5% vs 5%

Same $\beta = 0.0032$. A 1.5 Hz structure against a 5 Hz one.

4. The fix

Choose the ξ you want and compute β for each model from its own frequency: $\beta = 2\xi/\omega_1$.

Full note, with equations and tables, at the link on my profile.

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