

VIB : Dynamic response computation

Number of participants: 36



1. In order to compute the dynamic response of a structure, one needs to (put in the right order)

28 respondents

Most frequent combinations:

2	2	2
1	5	5
5	1	1
4	4	4
8	8	8
7	3	2
2	7	3
3	2	7
6	6	6

Correct answer

5	Identify geometry, material properties, boundary conditions and excitations	16
1	Make a model of the structure	14
4	Obtain the mass and stiffness matrices (and damping if available)	17
8	Compute the eigenfrequencies and mode shapes	11
7	Project the equations of motion in the modal domain	8

2	Perform a truncation (keep only the important mode shapes)	6
3	Solve the equations of motion for each mode separately (time or frequency domain)	9
6	Determine the response at specific dofs based on the modal responses	16



2. The modal response in the frequency domain is computed

19 correct answers
out of 29 respondents

using a convolution
between the impulse
response and the modal
force



10 votes



analytically as a function of
the modal properties (mass,
stiffness, damping) and the
modal force



19 votes

using a numerical
integration scheme



0 votes



3. The modal response in the time domain is computed

1 correct answer
out of 27 respondents

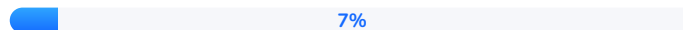


using a convolution
between the impulse
response and the modal
force



24 votes

analytically as a function of
the modal properties (mass,
stiffness, damping) and the
modal force



2 votes



using a numerical
integration scheme



4 votes



4. What are the ways to introduce damping in the model ?

0 correct answer
out of 30 respondents

modal damping

Rayleigh damping

Rayleigh

Tuned damped mass

Rayleigh damping, loss factor, modal damping

Rayleigh damping

Loss factor

Rayleigh damping, Modal damping approach, loss factor

Loss factor

3 ways, modal damping, and 2 weird names

Rayleigh, modal, loss factor

3 different types

Loss factor

Rayleigh, Loss factor and Modal Damping

rayleigh damping

modal damping

Ryaleigh Damping, Loss factor, Experimental damping factor for each mode

Loss factor

loss factor

Modal damping, rayleigh damping and loss factor

Constant damping Modal damoing Rayleigh damping

Viscous damping

1. Rayleigh 2. Modal 3. Loss factor

Rayleigh, etha/2, modal damping

Rayleigh, modal and loss factor

Loss factor, Rayleigh modal

Rayleigh, modal

Dampers

1-rayleigh 2-loss factor 3-modal damping

Raileygh damping

Correct answer

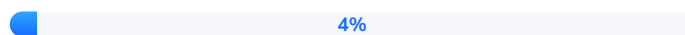
based on loss factors at the material level



5. For a MDOF system, with damping modelled using a loss factor, after a certain time, the impulse response is dominated by

17 correct answers
out of 23 respondents

the last mode



1 vote



the first mode



17 votes

a combination of all the modes



5 votes



6. For base excitation problems (such as earthquakes), the modal force is given by

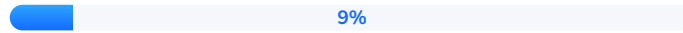
17 correct answers
out of 23 respondents

the total mass of the structure multiplied by the ground acceleration



4 votes

the mass of the base of the structure multiplied by the ground acceleration



2 votes



the modal acceleration factor which is a function of the mass matrix and the mode shape considered multiplied with the ground acceleration



17 votes