

VIB : Continuous systems

Number of participants: 20

1. A continuous system has

10 correct answers
out of 15 respondents

as many eigenfrequencies
as there are joints in the
structure

27%

4 votes

✓ an infinite number of
eigenfrequencies

67%

10 votes

it depends on the
frequency band of the
excitation signal

7%

1 vote

2. Can you match the boundary condition type for these real world structures

18 respondents

Lower control arm of a car

1

14 correct answers

B

Hinged

3. If the length of a bar is divided by 4, its natural frequency corresponding to traction-compression modes is

Bridge support

2

14 correct answers

C

11 correct answers out of 17 respondents

divided by 2

6%

1 vote

multiplied by 2

12%

2 votes

Wind turbine

3

15 correct answers

A

Clamped



multiplied by 4

65%

11 votes

divided by 4

18%

3 votes

4. If the length of a beam is divided by 2, its first natural frequency corresponding to a bending mode shape is

7 correct answers out of 14 respondents

divided by 2

7%

1 vote

multiplied by 2

43%

6 votes



multiplied by 4

50%

7 votes

divided by 4

0%

0 votes

5. If the stiffness of a beam is multiplied by 4, its natural frequencies are

14 correct answers out of 17 respondents

	multiplied by 4	6%	1 vote
✓	multiplied by 2	82%	14 votes
	divided by 2	12%	2 votes
	multiplied by 16	0%	0 votes

6. From which kind of continuous system are these the modeshapes?

10 correct answers
out of 15 respondents

	A simply supported beam	27%	4 votes
	A cantilevered beam	7%	1 vote



A double cantilevered beam

67%

10 votes

7. Modal truncation consists in

4 correct answers
out of 16 respondents



computing the response of a system using only the modes which are excited by the external forces

25%

4 votes

computing the response of a system using only the first 5 modes

19%

3 votes

using a truncation of the Fourier series of the excitation signal

56%

9 votes

8. When we truncate, what error do we introduce?

16 correct answers
out of 17 respondents

We change the number of resonance frequencies in the frequency band of interest

0%

0 votes

We change the frequencies of the first 5 modes

6%

1 vote



We ignore the influence of out-of-band modes in the frequency band of interest

94%

16 votes

When performing modal truncation, the usual

11 correct answers

9. When performing modal truncation, the usual practice consists in

11 correct answers

out of 16 respondents

	taking strictly the number of modes present in the frequency band of interest	6%	1 vote
✓	taking the number of modes in the band $[0, 1.5 \cdot w_{\max}]$ where w_{\max} is the max frequency of the band of interest	69%	11 votes
	taking the number of modes in the band $[0, w_{\max}/1.5]$ where w_{\max} is the max frequency of the band of interest	25%	4 votes

10. Consider a bar for which the ten first natural frequencies are at 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 Hz. You wish to compute the response using the truncation in the modal basis, from 0 to 5 Hz. How many modes should you use ?

14 correct answers
out of 17 respondents

	5 modes	18%	3 votes
	10 modes	0%	0 votes
✓	8 modes	82%	14 votes