

# VIB : 1DOF

Number of participants: 36



## 1. When describing a harmonic motion, the complex amplitude vector contains

**21 correct answers**  
out of 26 respondents

the phase information only		4%	1 vote
the amplitude and the frequency information		12%	3 votes
<input checked="" type="checkbox"/> both the phase and amplitude information		81%	21 votes
the frequency information only		4%	1 vote



## 2. The natural frequency of a mass-spring system depends on

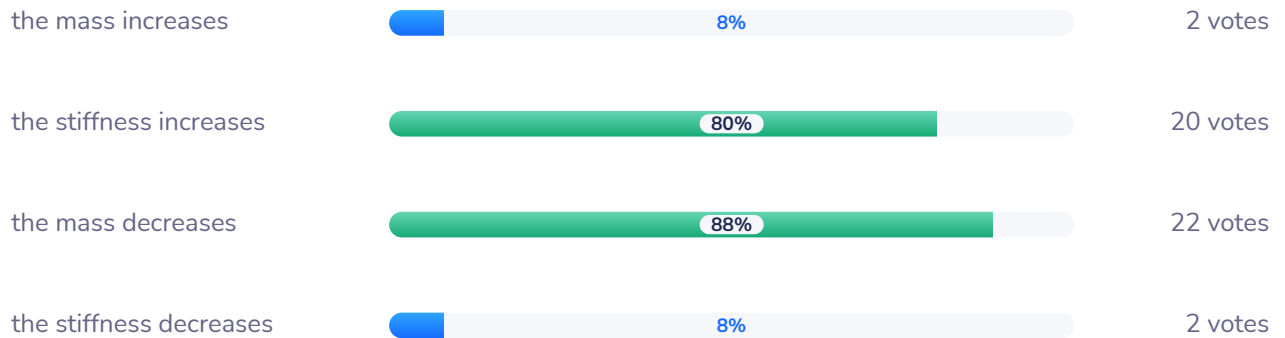
**19 correct answers**  
out of 29 respondents

<input checked="" type="checkbox"/> the mass of the system		66%	19 votes
<input checked="" type="checkbox"/> the stiffness of the system		93%	27 votes
the force with which we excite the system		7%	2 votes
the location of the force applied to the system		3%	1 vote



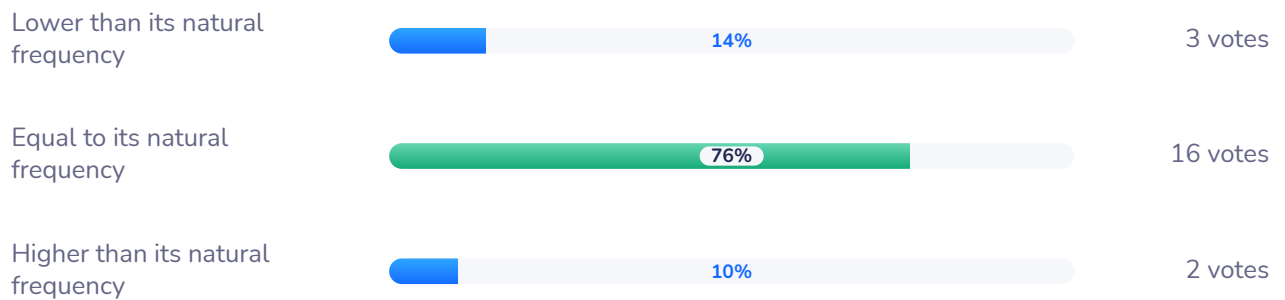
### 3. The natural frequency of a mass-spring system increases when

**19 correct answers**  
out of 25 respondents



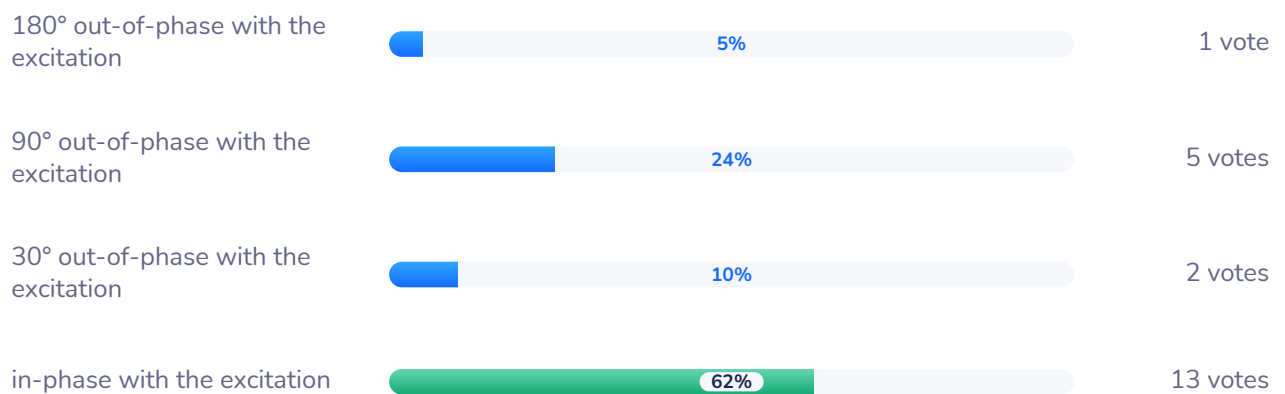
### 4. When an undamped 1DOF system is moved from the equilibrium position and then released, it oscillates freely at a frequency

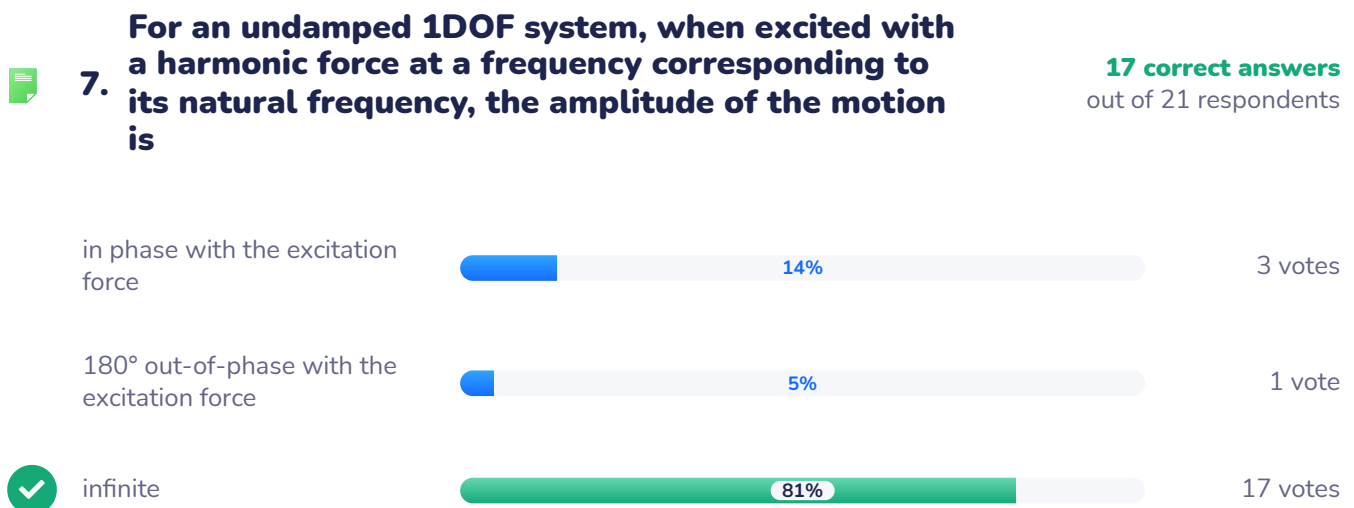
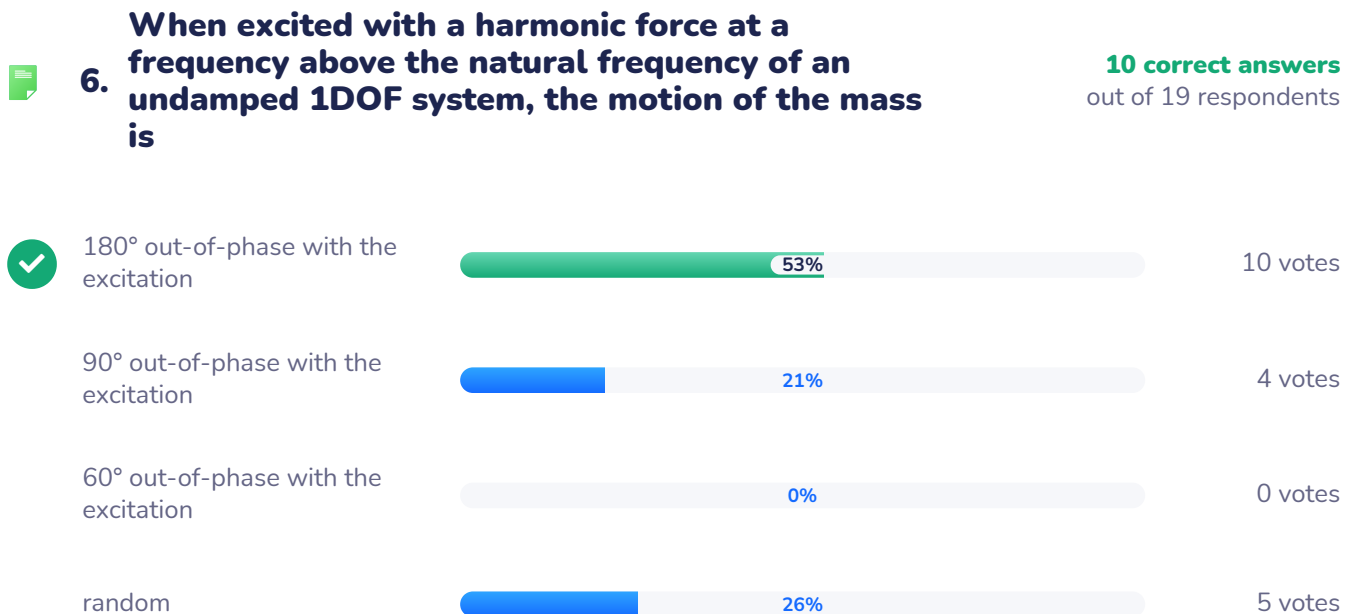
**16 correct answers**  
out of 21 respondents



### 5. When excited with a harmonic force at a frequency below the natural frequency of an undamped 1DOF system, the motion of the mass is

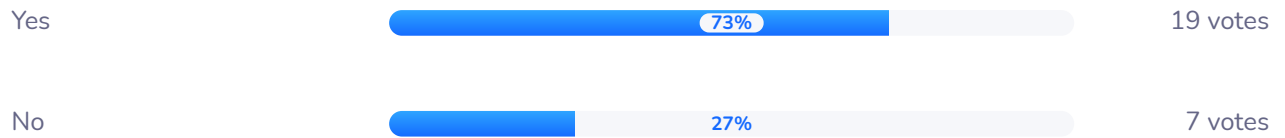
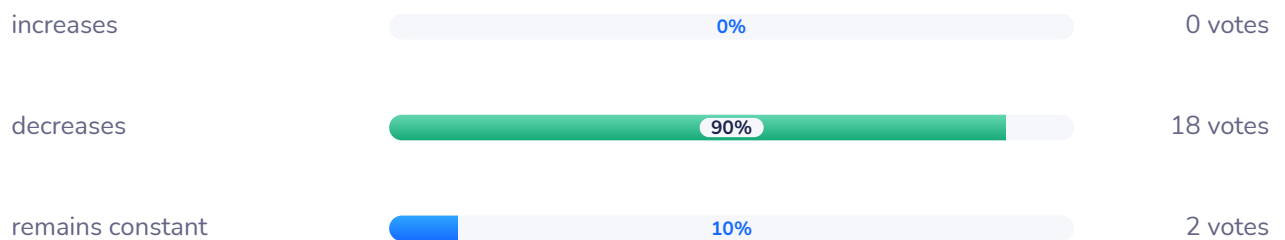
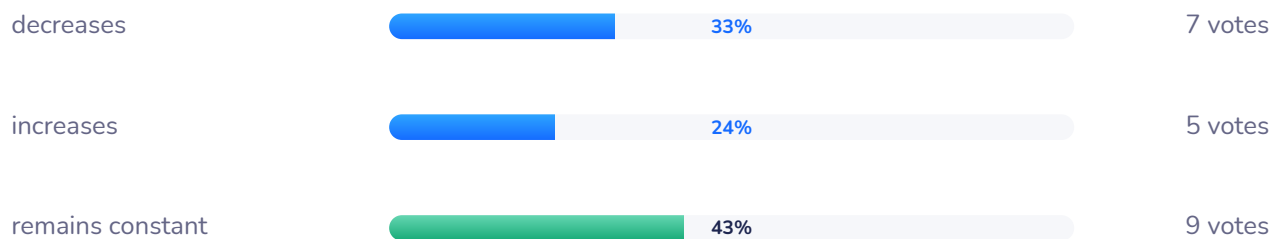
**13 correct answers**  
out of 21 respondents





**9. Have you watched the videos before coming to class?**

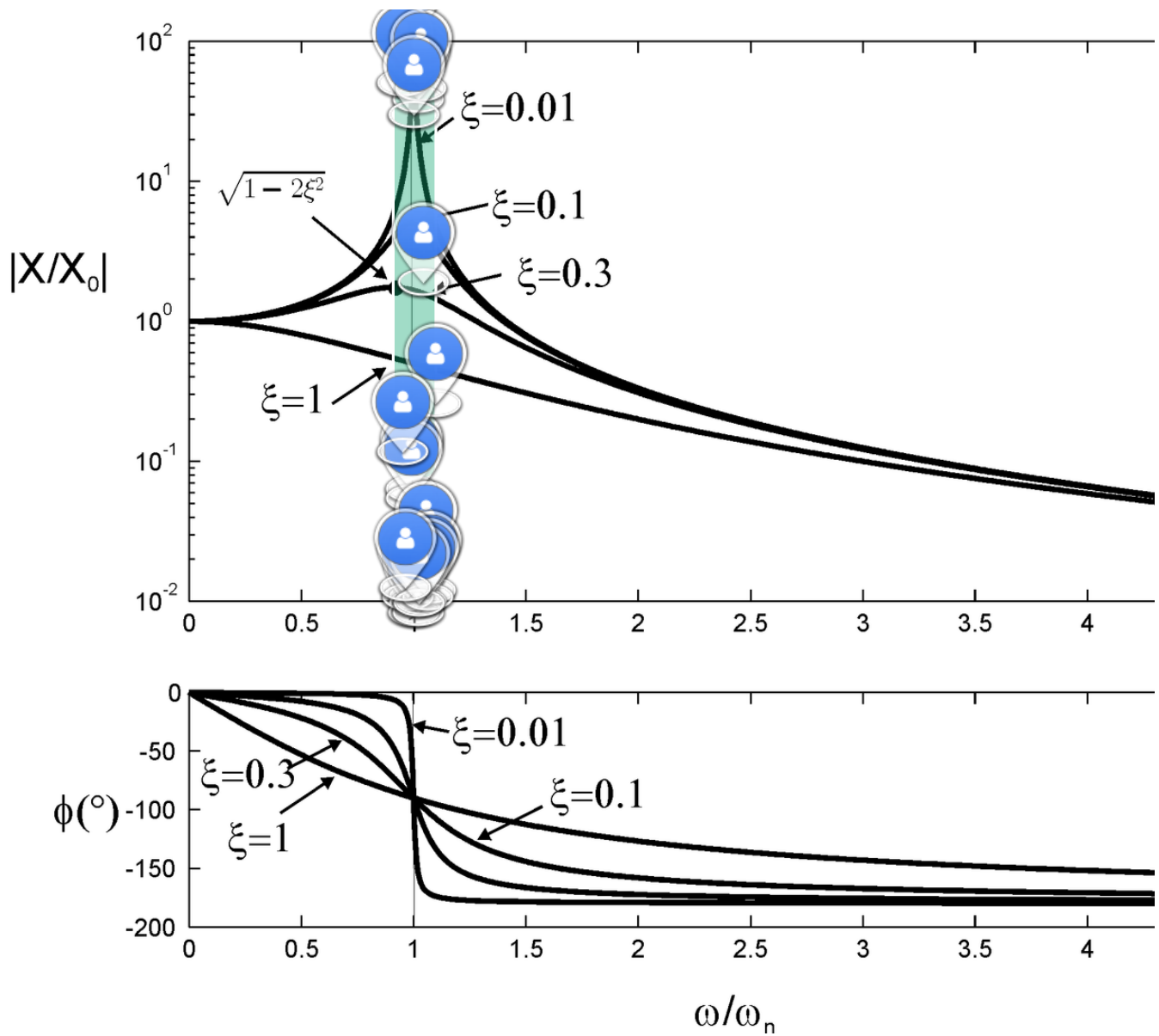
26 respondents

**10. When damping increases in a 1DOF system, the amplitude of vibration when excited near its natural frequency****18 correct answers**  
out of 20 respondents**11. When damping increases in a 1DOF system, the amplitude of vibration when excited far from its natural frequency****9 correct answers**  
out of 21 respondents



**12. Where is the resonant frequency of the 1DOF system on this diagram ?**

21 respondents





13. **What method should you use to compute the time domain response of a SDOF when the force applied to it is arbitrary ? What kind of mathematical operator does it involve ?**

**3 correct answers**  
out of 16 respondents

Laplace inverse

$h(t)*u(t)$

Convolution

We use FFT

Square state representation

-

T-->0 + Fourier

Convolution product with impulse response

Convolution with impulse resp.

Space state representation

Z transform, turn the integration into a convolution

Phasors

Impulse

Impulsive response and integrate it

Convolution

Convolution

**Correct answers**

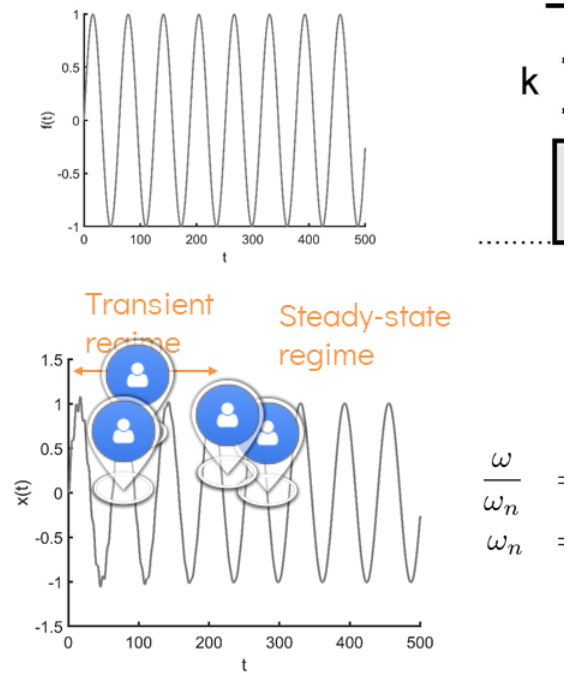
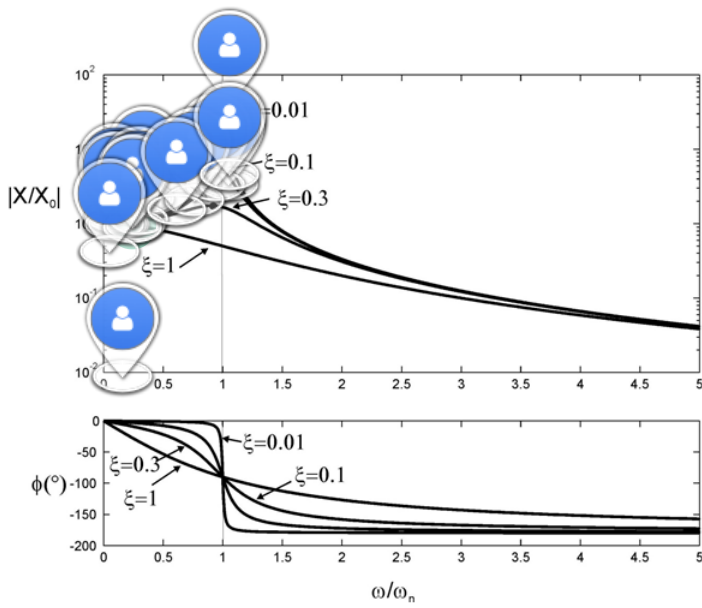
**Duhamels's integral**

convolution

14. To which area of the bode plot does the time domain response presented in the graph correspond to ?

20 respondents

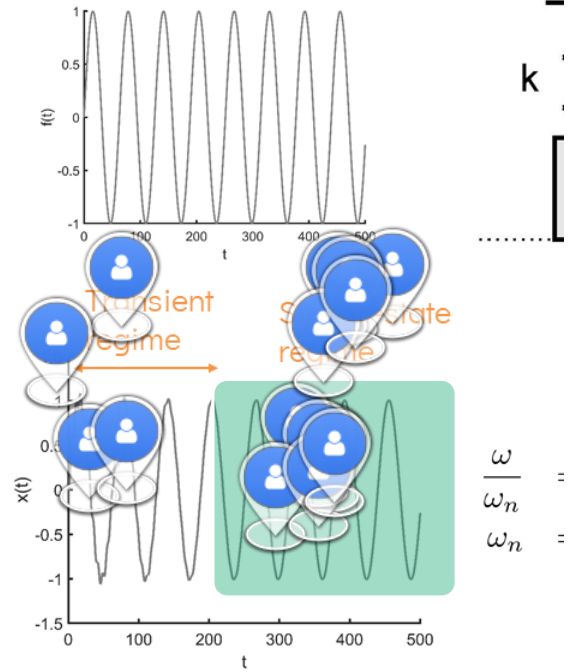
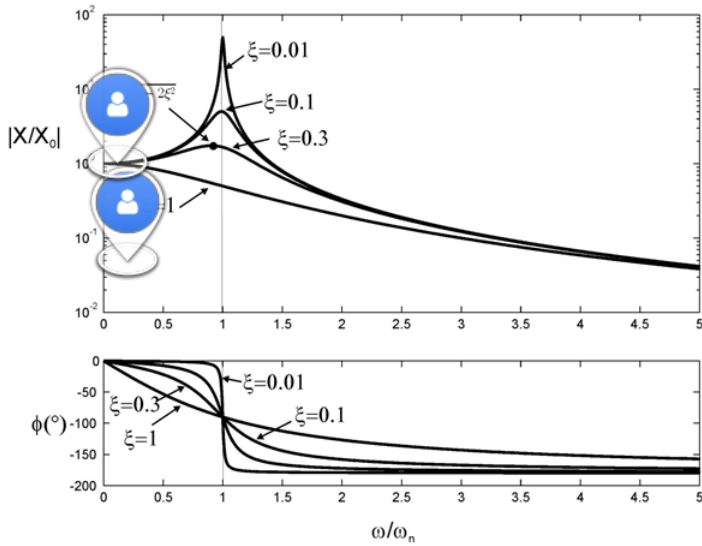
Bode plot vs time domain response



15. Which part of the time domain response actually corresponds to the hypothesis in the Bode plot ?

17 respondents

## Bode plot vs time domain response

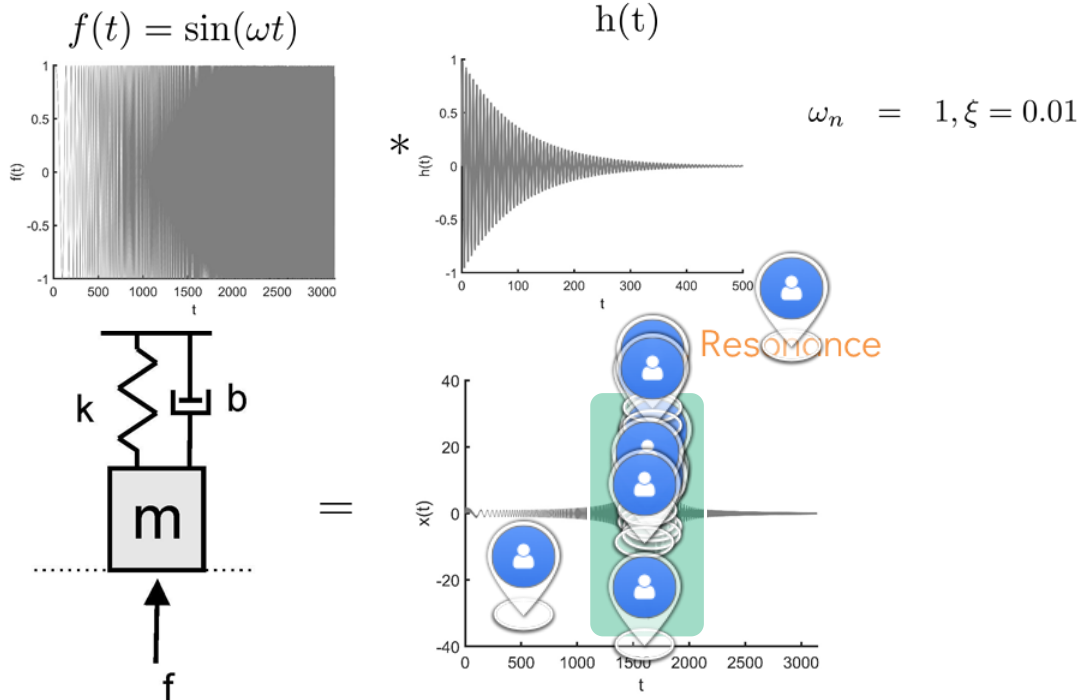




16. For a sine sweep excitation, which area of the time domain response represents resonance ?

12 respondents

## Sine sweep excitation



17. For a SDOF system with an imposed motion at its base, in terms of which unknown is the equation of motion generally written ? Why ?

18 correct answers out of 21 respondents

- the absolute displacement 10% 2 votes
- the relative displacement 86% 18 votes
- the absolute acceleration 5% 1 vote