

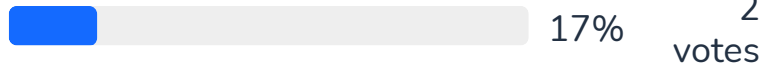
# VIB2021: Vibration Isolation

Number of participants: 14

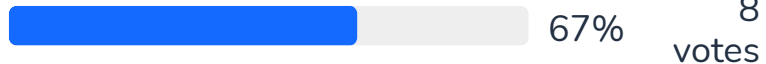
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## The problem of direct vibration isolation consists in

Reducing the force transmitted to an object using a spring, mass and dashpot system



✓ Reducing the force transmitted to an object by using a spring and dashpot



Reducing the motion of an object using a spring and a dashpot



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## Cite a few examples of direct isolation problems in everyday life

Lathe machine

optic equipments

Turbine, washing machine, power generators, engines

Precision equipment

washing machine, motors, car engine

Isolation of the vibrations of a washing machine

Building

Dampers on washing machine

Machine

Engine of the motor, washing machine

Railway tracks



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A simplified SDOF system can be considered to design an isolation system, it consists in

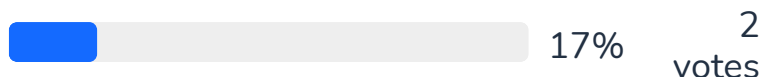
a mass, spring, dashpot system representing one of the modes of the object to be isolated



✓ a mass representing the object, assumed to be rigid, a spring and a dashpot representing the isolation system



a mass-spring system which is a reduced model of the object, and a damper representing the



isolation system

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The isolation domain is the range of frequencies for which

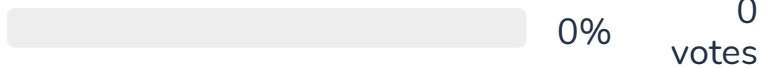
✓ the force transmitted by the object vibration is lower than the force applied to it



the force transmitted by the object vibration is higher than the force applied to it



the force transmitted by the object vibration is equal to the force applied to it

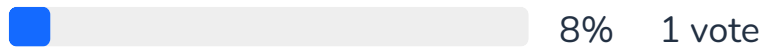




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The frequency limit between the isolation domain and the amplification domain is

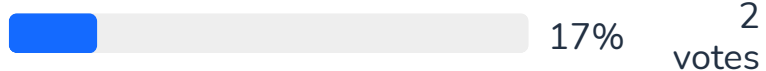
the natural frequency of the mass-spring system



✓ 1.4 times the natural frequency of the mass-spring system



2 times the natural frequency of the mass-spring system



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In an isolation system,  
damping is

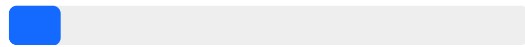
a good thing



0%

0  
votes

a negative thing



10%

1 vote

✓ it depends on  
the frequency of  
excitation and  
the natural  
frequency of the  
isolation system



90%

9  
votes

7

For the inverse vibration isolation problem, the isolation domain corresponds to

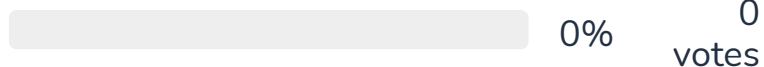
✓ A frequency band in which the sensitive equipment vibrates less than the structure to which it is attached



The domain in the system where the vibration is reduced



The domain for which thermal insulation is not necessary



A frequency band in which the the force transmitted to the environment is reduced



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## Cite a few examples of inverse vibration isolation problems in everyday life

All precision tools

sensitive electronic components

seat in a car

Car suspension

Laser to measure dénivelé

Microscope, buildings , weight scale

Microscope

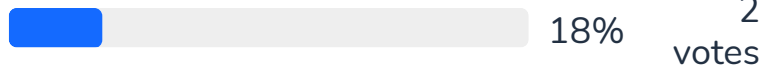
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To achieve isolation, the natural frequency of the mass-spring system should

correspond to the frequency range of excitation



be much higher than the frequency of excitation


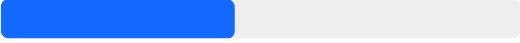
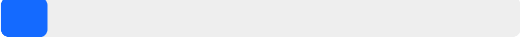


✓ be much lower than the frequency of excitation



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In order to increase the isolation domain, one can

- ✓ decrease the stiffness of the spring in the isolation system  100% 11 votes
- ✓ increase the mass of the system to isolate  45% 5 votes
- increase the damping in the isolation system  9% 1 vote

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The problem of transmission of vibrations from a tram to the surroundings should be treated as

✓ a direct vibration  
isolation  
problem



an inverse  
vibration  
isolation  
problem

