



SNS COLLEGE OF TECHNOLOGY

Coimbatore-35

An Autonomous Institution



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DEPARTMENT OF AEROSPACE ENGINEERING

19ASE306 – THEORY OF VIBRATIONS AND AERO ELASTICITY

III YEAR VI SEM

UNIT I – BASIC NOTATIONS

TOPIC 2 – TERMINOLOGIES

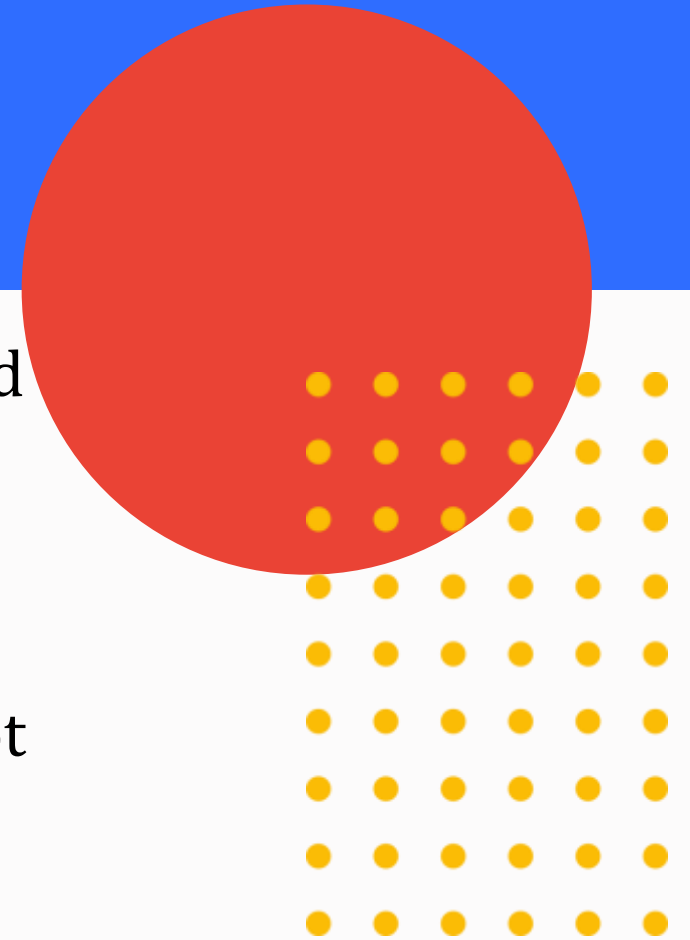
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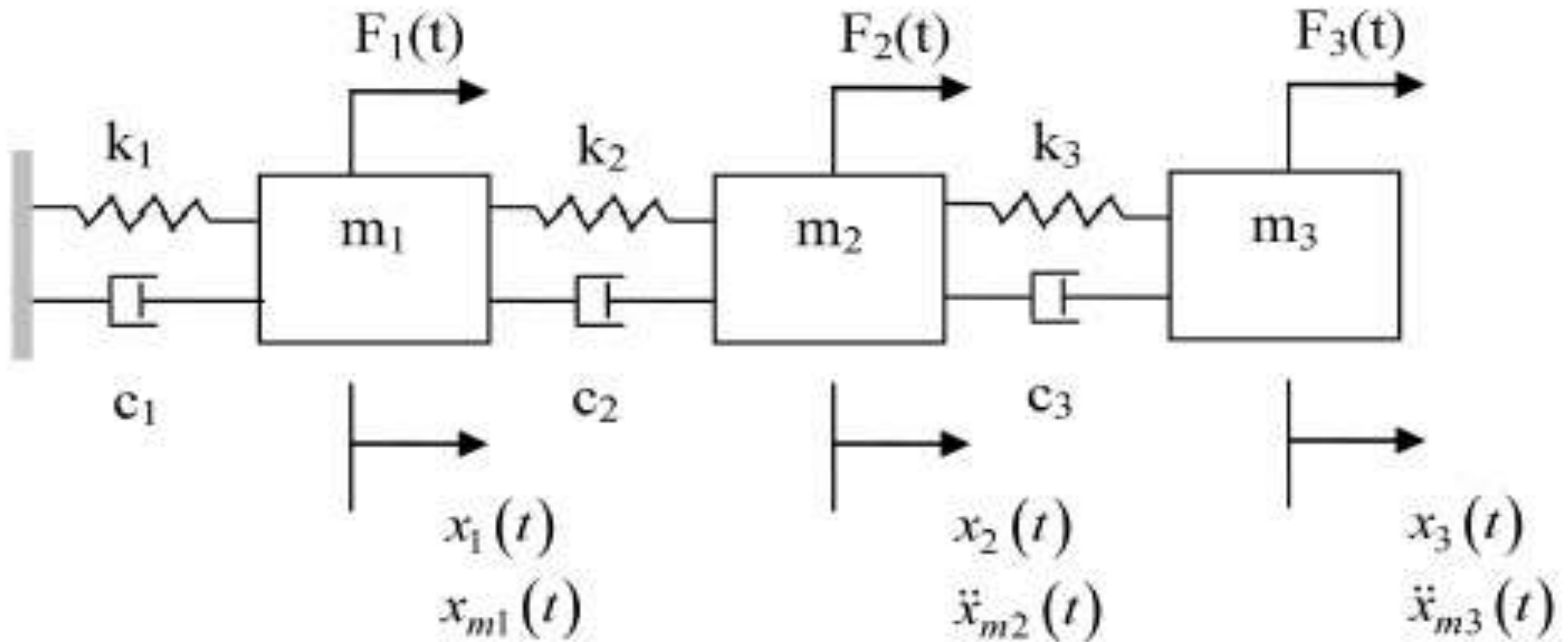
INTRODUCTION

- Vibration means quickly moving back and forth (or up and down) about a point of equilibrium
- Something that is vibrating may shake at the same time
- If it vibrates in a regular way, it may produce a musical note because it can make the air vibrate.
- This vibration will send sound waves to the ear and to the brain





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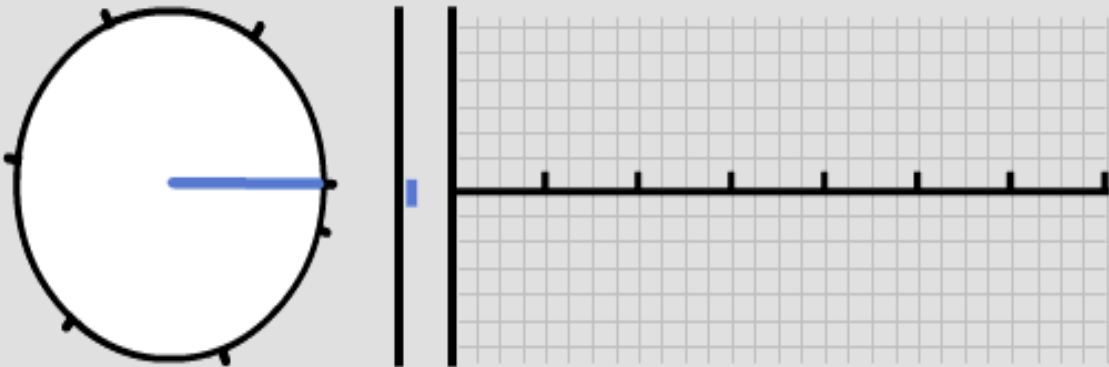




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Vibrations: more than buzz



Vibration doesn't just apply to things that shake - anything that moves or changes with a regular rhythm is vibrating in physics-speak.

- How far (amplitude or intensity), and how fast (frequency) the object moves helps determine its vibrational characteristics
- The terms used to describe this movement are frequency, amplitude and acceleration





QUESTIONS RELATED TO ABOVE SLIDES

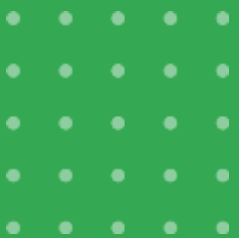




SPIRITUAL VIBRATIONS

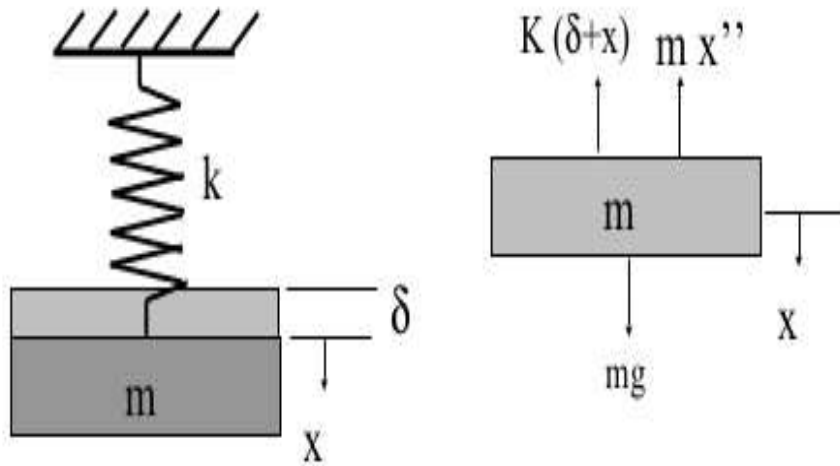


- Spiritual vibrations are a way of viewing everything in the universe, including our own little spot within it, as connected
- In this article, we will look at what are spiritual vibrations, what it means to vibrate at a higher frequency and how to raise your vibration if you feel like you're not...
- In the linear spring shown in Fig. 2.1, the change in the length of the spring is proportional to the force acting along its length: $F = k(x - u)$





DEGREE OF FREEDOM SYSTEM



Static Equilibrium

$$F = k\delta \quad F = mg$$

δ = static deflection

K = spring rate = force/deflection

X = displacement

Mass: A mass is a rigid body (Fig) whose acceleration x according to Newton's second law is proportional to the resultant of all forces acting on the mass

Damper: In the viscous damper shown in Fig the applied force is proportional to the relative velocity of its connection points





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- It consists of a mass m attached by means of a spring k to an immovable support
- The mass is constrained to translational motion in the direction of the X axis so that its change of position from an initial reference is described fully by the value of a single quantity x
- For this reason it is called a single degree-of freedom system





ASSESSMENT QUESTIONS



- 1) The natural frequency (in Hz) of free longitudinal vibrations is equal to
- a) $1/2\pi\sqrt{s/m}$
 - b) $1/2\pi\sqrt{g/\delta}$
 - c) $0.4985/\delta$
 - d) all of the mentioned

Ans : _____

- 2) The factor which affects the critical speed of a shaft is

Ans : _____

- 3) The equation of motion for a vibrating system with viscous damping is $d^2x/dt^2 + c/m \times dx/dt + s/m \times x = 0$

If the roots of this equation are real, then the system will be

Ans : _____



REFERENCE LINKS

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https://books.google.co.in/books?id=0fl1pKtaghAC&printsec=frontcover&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false

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THANK YOU...

