2.1. Introduction (NP 2.1) — # 1

Consider the simplest of all sdof systems, a spring-mass model sketched below. p.23 of notes package

Fill in the class

2.1. Introduction (NP 2.1) — # 2

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2.2.2 Elements of Vibration– Spring (NP 2.2) — # 1

A spring resists relative displacement x between its two ends. How do we find spring constants? Consider a spring with one end fixed and the other end subjected to an external force f_s as sketched below. p.24 of notes package

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2.2.2 Elements of Vibration– Spring (NP 2.2) — # 2

Q: Suppose you are given an expression for force f_s as a function of displacement x. How will you determine the spring constant, k using $f_s = kx$?

Fill in the class

2.3. Force Method (NP 2.3) — # 1

The following steps are to be followed when applying the force method:

1. Isolate the system you want to draw the FBD for.
2. Select an appropriate set of displacement co-ordinates.
3. Draw the FBD of the system for which you seek to determine equations of motion.
4. If you wish to apply Newton's second law, do not indicate inertial forces in the FBD. Use Eq.(1a) or Eq.(1b).
5. Determine absolute accelerations using kinematics
6. Do indicate inertial forces and inertial moments (as required) acting at the centre of mass. Remember that mass moment moments of inertia J_o is about centre of mass in the FBD. Use Eq.(2a) or Eq.(2b).

2.3. Force Method (NP 2.3) — # 2

Let us formulate the equation of motion of an undamped spring-mass system using both the approaches. p.30 of notes package

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2.3. Force Method (NP 2.3) — # 3

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2.3. Force Method (NP 2.3) — # 4

Q: Can you draw the FBDs when the displacement co-ordinate is chosen as positive in opposite direction to the above?

Fill in the class

Example 3 — # 2

Fill in the class

Example 3 — # 3

Fill in the class

Example 3 — # 4

Fill in the class

Example 3 — # 5

Fill in the class