Science Virtual Learning

MPI Physics 210

Rotational Dynamics 7 – Moment of Inertia 1
April 27, 2020

Lesson: MPI Moment of Inertia 1
April 27, 2020

Objective: To understand the concept of moment of inertia, and how to calculate for a point mass rotating about an external axis

This video discusses Moment of Inertia "I", which is how much an object resists being rotated.

https://youtu.be/sdjXpLcmiBA

Video: Moment of Inertia 1

These videos gives two examples of calculating Moment of Inertia for point masses.

Part 1: https://youtu.be/l767UD3PnAk

Part 2: https://youtu.be/3oMkjnkfD7k

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Videos: Moment of Inertia 1 - Examples

1. The yellow ruler has 0.0454 kg of quarters taped 0.0300 m to the left of the central axis, and 0.0397 kg of quarters 0.0300 m to the right of the axis. The red ruler has the same masses taped 0.150 m on each side of the central axis. What is the moment of inertia of each ruler about the central axis?

Example 1 from the Videos

1. The same red ruler is now rotated about an axis located at the end where the 7 quarters are (0.0397 kg). What is the moment of inertia about that axis?

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Example 2 from the Videos

Homework

A long thin stick has three masses attached to it: a 3.00 kg mass m1 at the left end, a 2.00 kg mass m2 1.50 m to the right of m1, and a 4.00 kg mass m3 0.750 m to the right of m2.

a) What is the moment of inertia of the system about an axis located on m2?
b) What is the moment of inertia of the system about an axis located on m3?

- Try to solve the problem yourself, then watch the solution video:
- Part 1: https://youtu.be/wtri4ZsTpH4
- Part 2: https://youtu.be/XfH1U5VdauY

That's it!