

Koriolis teoresi

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1 Introduction

[12pt]article amsmath geometry margin=2.5cm

Koriolis Teoremasiga Doir Masalalar

1-masala: Aylanuvchi platformadagi jismga Koriolis kuchi

Shart:

- $v = 3 \text{ m/s}$ (jismning radial yo'nalishdagi tezligi)
- $\omega = 5 \text{ rad/s}$ (platformaning burchak tezligi)
- $m = 1 \text{ kg}$ (jism massasi)

Yechim:

Koriolis kuchining formulasi:

$$F_k = 2m\omega v$$

Qiymatlarni qo'yib hisoblaymiz:

$$F_k = 2 \cdot 1 \cdot 5 \cdot 3 = 30 \text{ N}$$

Javob: Jismga ta'sir qiluvchi Koriolis kuchi 30 N ga teng.

2-masala: Yerga tushayotgan jismning gorizontal siljishi

Shart:

- $m = 2 \text{ kg}$ (jism massasi, lekin bu formulada qatnashmaydi)

- $h = 100\text{ m}$ (balandlik)
- $\Omega = 7.29 \times 10^{-5}\text{ rad/s}$ (Yerning burchak tezligi)
- $g = 9.81\text{ m/s}^2$ (erkin tushish tezlanishi)
- $v_0 = 0$ (boshlang'ich tezlik)

1-qadam: Tushish vaqti t ni topamiz

$$t = \sqrt{\frac{2h}{g}} = \sqrt{\frac{2 \cdot 100}{9.81}} = \sqrt{20.387} \approx 4.52\text{ s}$$

2-qadam: Oxirgi tezlik v ni hisoblaymiz

$$v = \sqrt{2gh} = \sqrt{2 \cdot 9.81 \cdot 100} = \sqrt{1962} \approx 44.3\text{ m/s}$$

3-qadam: Gorizonta siljish d ni hisoblaymiz

Formulasi:

$$d = \frac{2\Omega h v}{g}$$

Qiymatlarni qo'yamiz:

$$d = \frac{2 \cdot (7.29 \times 10^{-5}) \cdot 100 \cdot 44.3}{9.81}$$

$$d = \frac{0.644454}{9.81} \approx 0.0657\text{ m}$$

Javob: Jism Koriolis ta'sirida 0.0657 m (ya'ni 6.57 cm) gorizonta siljiydi.