Physics Cup 2026

February 9, 2026

1 Hint

Express the angular distance 2α between the two foci of a hyperbola, as seen from an arbitrary point on the hyperbola, in terms of the angle β of the tangent line at that point and the eccentricity ϵ of the hyperbola.

2 Hint

The first step towards the solution is very similar to the T2 solution of the European Physics Olympiad Problem No 2 from 2023.

3 Hint: (More Detailed Explanation to Follow Hint 01)

There is a simple relationship between $cos\alpha$ and $cos\beta$ that can be obtained by considering four applications of the law of cosines for two suitably chosen triangles.

4 Hint

The first step is to figure out what is the brick's hodograph looks like. It is also worth consulting Problem No.2 from the 2023 European Physics Olympiad.

Second, you want to integrate v_y over time $l_y = \int u_y dt = \int u_y \frac{u_x}{a_x}$, where the x component of the acceleration a_x can be expressed in terms of a_0 and the relevant angles.

5 Hint: The "Final" Boss

Here are the steps to solve the problem.

First, determine the brick's hodograph and describe its shape with a formula in Cartesian coordinates (this will be needed later). You may find it helpful to consult the T2 solution of the European Physics Olympiad Problem No 2 from 2023.

Second, express the force exerted by each plate in terms of the given quantities.

Third, express the displacement as an integral of v_y over time $l_y = \int u_y dt = \int u_y \frac{u_x}{a_x}$, where the x component of the acceleration a_x can be expressed in terms of a_0 and the relevant angles.

Fourth, using the hodograph's formula, express the integrand in terms of either u_x or u_y. Note that integration by parts may be helpful here.

Fifth, solve the integral, then submit Answer to Physics Cup Email