A jumping cylinder in an incline RAUL W. GOMEZ, JORGE HER-
NANDEZ, VIVIANNE MARQUINA, Facultad de Ciencias, UNAM — The problem
of a cylinder of mass m and radius r, with its center of mass out of the cylinder axis,
rolling in an incline that makes an angle α respect to the horizontal is analyzed.
The equation of motion is solved to obtain the site where the cylinder loses contact
with the incline (jumps). Several simplifications are made: the analyzed system con-
sists of an homogeneous disc with a one dimensional straight line of mass parallel
to the disc axis at a distance d < r of the center of the cylinder. To compare our
results with experimental data, we use a Styrofoam cylinder of radius r = 10.0 $\pm$
0.05 cm, high h = 5.55 $\pm$ 0.05 cm and a mass m_1 = 24.45 $\pm$ 0.05 g, to which a 9.50
$\pm$ 0.01 mm diameter and 5.10 $\pm$ 0.001 cm long brass road of mass m_2 = 30.75 $\pm$
0.05 g was imbibed parallel to the disc axis at a distance of 5.40 $\pm$ 0.05 cm from it.
Then the disc rolls on a 3.20 m long wooden ramp inclined at 30 $^\circ$ and 45 $^\circ$ respect
to the horizontal. To determine the jumping site, the movements were recorded
with a high-speed video camera (Casio EX ZR100) at 400 frames per second. The
experimental results agree well with the theoretical predictions.

Vivianne Marquina
Facultad de Ciencias, UNAM

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