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Rolling of asymmetric disks on an inclined plane

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(Submitted on 20 Jul 2011)

In a recent papers, Turner and Turner (2010 {\em Am. J. Phys.} {\bf 78} 905-7) and Jensen (2011 {\em Eur. J. Phys.} {\bf 32} 389-397) analysed the motion of asymmetric rolling rigid bodies on a horizontal plane. These papers addressed the common misconception that the instantaneous point of contact of the rolling body with the plane can be used to evaluate the angular momentum $\mathbf L$ and the torque $\boldsymbol\tau$ in the equation of motion $d\mathbf L/dt = \boldsymbol\tau$. To obtain the correct equation of motion, the "phantom torque" or various rules that depend on the motion of the point about which $\mathbf L$ and $\boldsymbol\tau$ are evaluated were discussed. In this paper, I consider asymmetric disks rolling down an inclined plane and describe the most basic way of obtaining the correct equation of motion; that is, to choose the point about which $\mathbf L$ and $\boldsymbol\tau$ are evaluated that is stationary in an inertial frame.

Submission history

From: Ben Yu-Kuang Hu [view email]

[v1] Wed, 20 Jul 2011 18:24:28 GMT (8kb)

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