classical mechanics \rightarrow rigid body motion

Rolling Disk on Uneven Surface

A disk of radius R has a mass M uniformly distributed inside it, and rolls along a surface when it encounters a bump where the surface deflects by an angle θ . Assume there is no slipping in this problem.



- (a) What is the maximum speed at which the disk can move, v, such that the disk does not fly off of the surface at the bump?
- (b) Somewhat interestingly, your answer should not go to ∞ as $\theta \to 0$. Discuss what this implies for the motion of this rolling object on a surface which is slightly uneven.
- (c) What happens as θ gets large? Discuss a practical implication of this result of your choice.