

Work Sheet

Student Name: _____

Team members:

1.- _____ 2.- _____

3.- _____ 4.- _____

Instructor: _____

Introduction¹

Analysis

Orbiting Puck

1. Calculate the velocities at r_{\max} and r_{\min} , using the distance between the two dots and the spark frequency. This is the perpendicular component of the velocity at those points.

2. Calculate the angular momentum using $|L| = mrv_{\perp}$ at both r_{\max} and r_{\min} .

Spinning Bicycle Wheel

1. Sketch and explain what happened in steps 4 and 6.
2. For the steps 9 and 10, sketch and explain why re-orienting the wheel left to right, and front to back produces the same effect.
3. Sketch and explain what happened in step 11.
4. If the initial spin rate of the wheel were same for the steps 9, 10, and 11, would your rotation rate be the same in each? Explain why.

5. We stated in the background that the angular speed of the wheel does not change when reoriented even though it induces rotation in you; kinetic energy is clearly not conserved. If the initial kinetic energy of the system was the rotational energy of the wheel - which remains constant - where did your rotational energy come from?

Conclusions

¹This is an adaption from S. Sugaya's original version