CONNECTED WHEELS (STATIC)

● Problems where two wheels **(**discs**,** cylinders**,** etc.**)** are connected are fairly common in Rotational Kinematics**.**

- In some cases, the wheels rotate around a FIXED Axis **(w** BUT no $\mathbf{v_{,CM}}$**)** → fixed pulleys/gears, static bicycles

- In others, the wheels rotate around a FREE Axis **(w** AND $\mathbf{v_{,CM}}$**)** → bicycle moving on the ground

- Whenever a chain connects two wheels, we have _____**,** which yields a set of 4 related equations**:**

EXAMPLE 1**:** Two gears (R_1 = 2 m**,** R_2 = 3 m) are free to rotate about fixed axes, with a light chain that runs around them, so they spin together (as above). When you give the smaller pulley 40 rad/s, what angular speed will the larger one have**?**

EXAMPLE 2**:** Two pulleys, with radii 0.3 m (left) and 0.4 m (right) attached to a table as shown below. A light cable runs through the edge of both pulleys, with one end connected to a mass. You pull down on the other end, causing the pulleys to spin (and the block to move up). When the cable has speed 5 m/s, what will the angular speed of each pulley be**?**