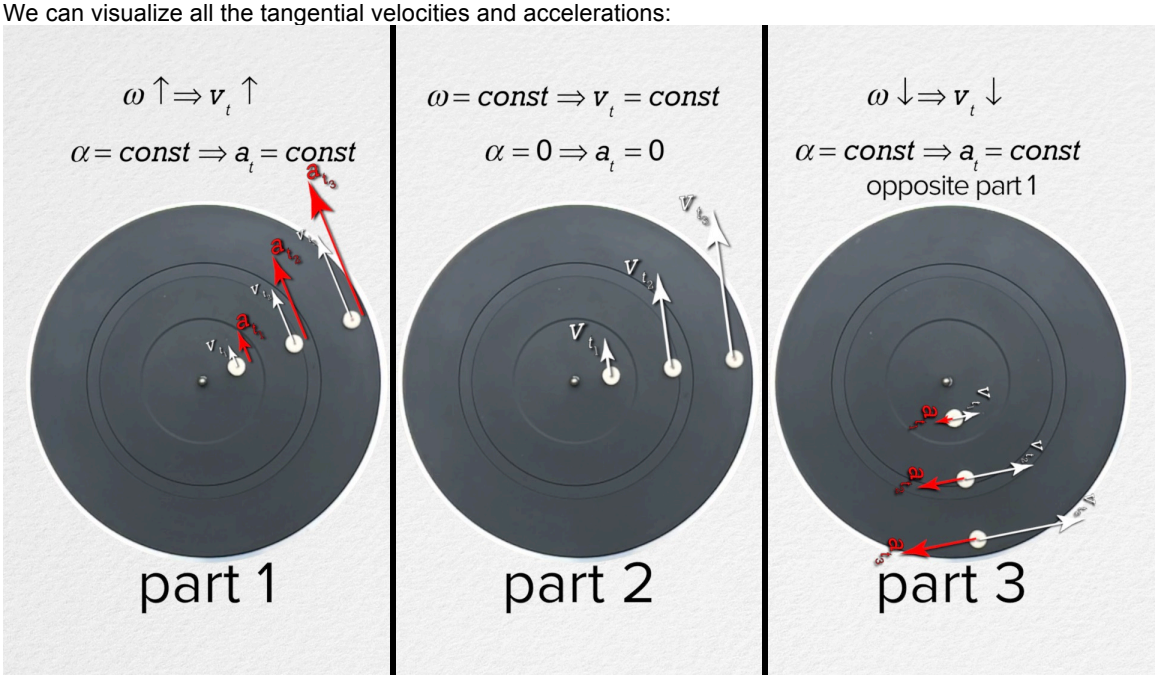
Flipping Physics Lecture Notes:

Demonstrating the Directions of Tangential Velocity and Acceleration

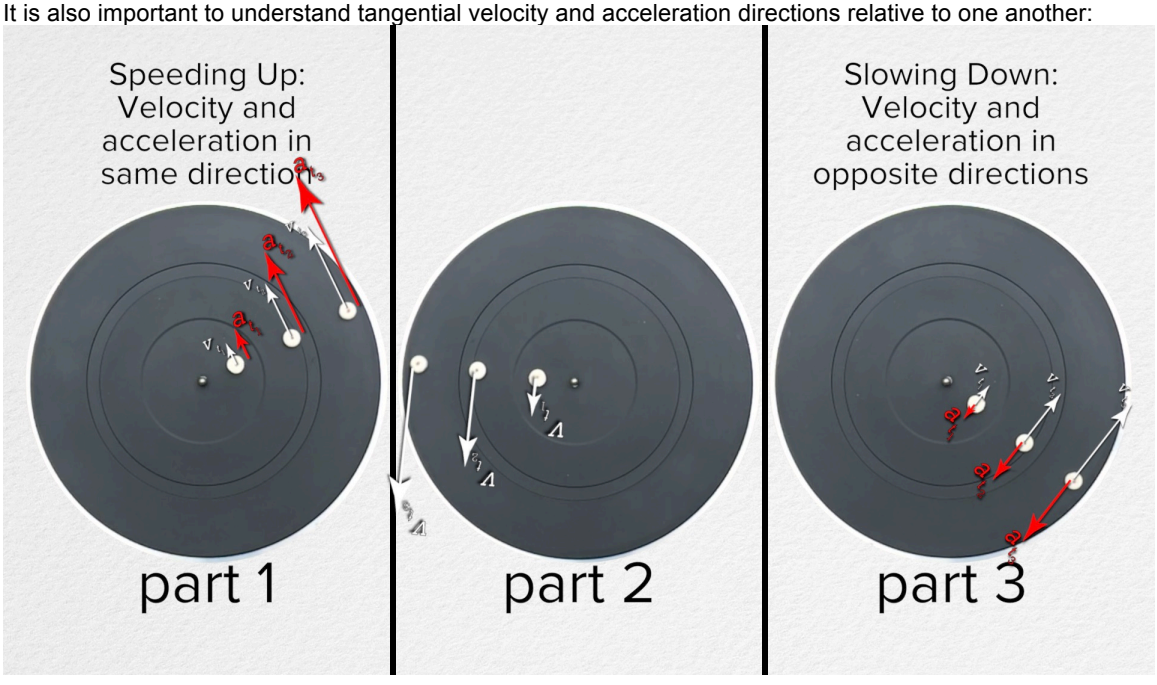
There are three different parts to the demonstration.

1. The turntable is plugged in and angularly accelerates at 4.2 rad/s^2 up to 33 rev/min in less than one second.
2. The turntable rotates at 33 rev/min for around one and a half seconds.
3. The turntable is unplugged and angularly accelerates at -1.5 rad/s^2 to a stop in slightly more than two seconds.

We can visualize all the tangential velocities and accelerations:



It is also important to understand tangential velocity and acceleration directions relative to one another:



And $\Delta\theta, \omega, \alpha$ refer to the whole object, however, s, v_t, a_t refer to a specific point on the object.