Phase space of angular velocity and angular acceleration:

Phase space of angular velocity and angular acceleration shows the evolution of vertical pendulum system. Red curve represents the rotational period of the system, shifting from right (greater magnitude of angular velocity) to left. Extremes of angular acceleration remains constant since the position of acceleration (top of wheel) is the same for every rotation and oscillates around zero due to the repetitive increase and decrease in the angular velocity. Rotations finally ends where the angular velocity reaches zero (note: angular acceleration still has non negative magnitude) and the system starts oscillations. Blue curves represent the oscillation, reducing in extreme values of both parameters.