5.3.5 Power consumption and efficiency

Because we know the instantaneous values for the velocities and the forces, we can easily calculate the power consumption in the motion of the spheres through the viscous fluid. The rate of power consumption at any time is given as

$$\mathcal{P} = F_1 v_1 + F_2 v_2 + F_3 v_3 = F_1(-\dot{L}_1) + F_3(\dot{L}_2), \tag{5.46}$$

where the second expression is the result of enforcing the force-free constrain of Eq. (5.25).