$$\frac{\ln(mg - V\rho g - 6\pi R\eta u)}{-6\pi\eta R} = \frac{t}{m}$$

$$mg - V\rho g - 6\pi R\eta u = \exp\left(\frac{-6\pi\eta R t}{m}\right)$$

$$u = \frac{mg - V\rho g - \exp\left(\frac{-6\pi\eta R t}{m}\right)}{6\pi R\eta}$$

$r = 10^{-5}\,m$, $d = 1000\,kg/m^3$ $\quad D_S = 8050\,kg/m^3$

$\eta = 10^{-3}\,Pa\,s$ $\quad g = 9.8\,m/s$

Terminal velocity is at $t = \infty$

$$mg - V\rho g - 6\pi\eta R u = 0$$

$$u = \frac{mg - V\rho g}{6\pi\eta R}$$