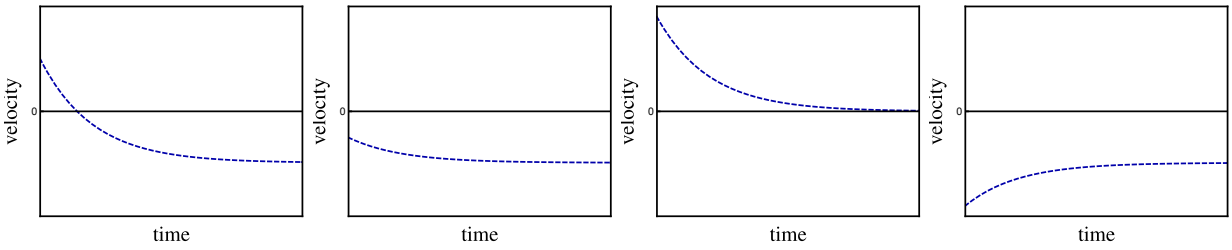
Quiz 2

1. Find the terminal velocity of an object subject to gravity $F = -mg\hat{y}$ and $\vec{F} = -b\,\vec{v}$.

2. Consider the plots of velocity vs. time below. For each description of a physical system, select plot matches the description. Assume a coordinate system where gravity points in the $-\hat{y}$ direction (in other words, moving "up" gives a positive velocity, and moving "down" gives a negative velocity).



(a) (b) (c) (d)

   (i) The horizontal velocity of a particle subject to linear drag force

   (ii) The vertical velocity of particle falling down, starting with a speed smaller in magnitude than its terminal velocity

   (iii) The vertical velocity of a particle subject to linear drag force that is thrown upwards, then eventually reverses direction and falls down

   (iv) The vertical velocity of particle falling down, starting with a speed larger in magnitude than its terminal velocity

3. Simplify the following equation:

$$1 + i\theta + \frac{(i\theta)^2}{2!} + \frac{(i\theta)^3}{3!} + \frac{(i\theta)^4}{4!}$$

such that each term only has at most one power of i. You can leave the factorials as they are.