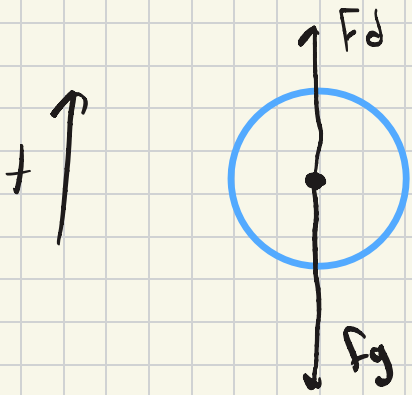
Ball in air $(y(t) > R)$



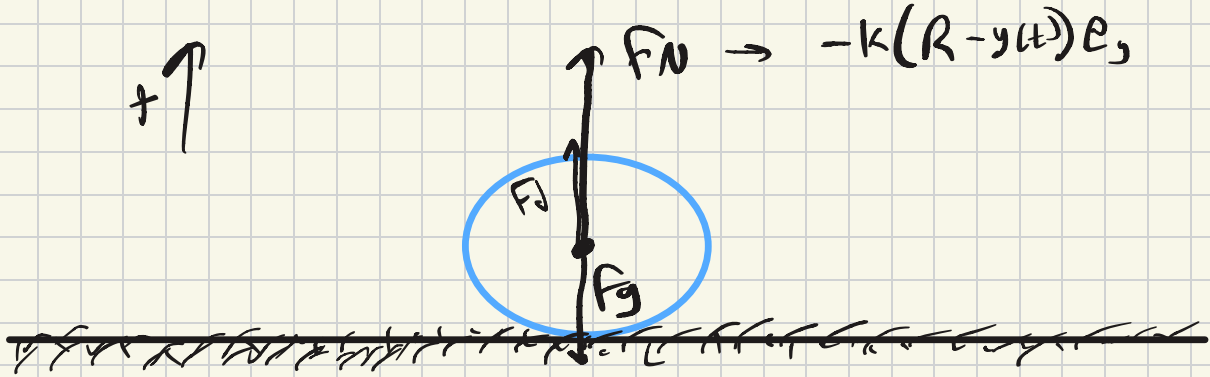
Accel:

$$F_{net} = ma_y$$

$$ma_y = -mg - bv_y$$

$$\boxed{a_y = -g - \frac{b}{m}v_y}$$

Ball hitting ground $(y(t) < R)$



Accel:

$$\boxed{a_y = -g - \frac{b}{m}v_y - \frac{k}{m}(R - y)}$$

$$f_{net} = ma_y$$

$$ma_y = -mg - bv_y - k(R - y)$$