Solutions

2.1

- $t = \sqrt{2 \times 1.25/9.81} = 0.505$ s.
- Range $= 2.2 \times 0.505 = 1.111$ m.

2.2

- $v_y = gt = 4.952$ m/s, so $v = \sqrt{2.2^2 + 4.952^2} = 5.419$ m/s.
- Direction $\arctan(4.952/2.2) = 66.1°$ below horizontal.

2.3

- $v = \omega r = 1.350$ m/s.
- $a_r = \omega^2 r = 4.050$ m/s^2 inward; $a_\theta = r\dot{\omega} = 0.900$ m/s^2.
- Total $= \sqrt{4.050^2 + 0.900^2} = 4.149$ m/s^2.

2.4

- (a) The vertical fall fixes t; the horizontal ride ends at the same instant - one clock, two axes.
- (b) Constant ω still turns the velocity's direction: $a_r = \omega^2 r \neq 0$.

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