

1 | boatman problem

Target displacement: $\langle 3\text{km}, 2\text{km} \rangle$

We are working with the velocities of the boat and the river. The velocity of the river is defined as $r = \langle 0, -3.5 \rangle$. We want to find vector $v = \langle v_x, v_y \rangle$ s.t.

$$\begin{aligned}|v| &= 13 \text{ km/h} \\ \lambda(v + r) &= \langle 3, 2 \rangle\end{aligned}$$

Where the trip will take λ hours

$$\begin{aligned}v_x^2 + v_y^2 &= 13^2 \\ \lambda(v_x + 0) &= 3 \\ \lambda(v_y + -3.5) &= 2\end{aligned}$$