Answer on Question #74564-Physics-Mechanics-Relativity

A sail boat sails at a heading of 72 degrees with a velocity of 20.0 km/h. The boat sails in a current of 5.00 km/h at a heading of 25 degrees.

What is the actual velocity of the boat?

Solution

The actual velocity of the boat is

$$\boldsymbol{V} = \boldsymbol{V}_{\boldsymbol{boat}} + \boldsymbol{V}_{\boldsymbol{current}}$$

$$V_x = 20\cos 72 + 5\cos 25 = 10.71\frac{km}{h}$$

$$V_y = 20\sin 72 + 5\sin 25 = 21.13\frac{km}{h}$$

$$V = \sqrt{(10.71)^2 + (21.13)^2} = 23.7\frac{km}{h}$$

$$\theta = \tan^{-1}\frac{21.13}{10.71} = 63.1°$$

The actual velocity of the boat is 23.7 km/h at a heading of 63.1 degrees.