

MATH 2425
CALCULUS II
Lab 11: Week of November 18, 2009
A Flying Lear Jet

Problem

Suppose that you wish to fly your Lear 45 jet in a direction specified by the unit vector \mathbf{u} . Unfortunately, there is a stiff wind blowing with a direction and magnitude of \mathbf{w} . Your aircraft is normally capable of flying at true airspeed of s nautical miles per hour. Because of the wind, however, your heading must deviate from the direction of travel in order to actually move in that direction. Find the heading and ground speed of your aircraft.

Setup

Given

$$\mathbf{u} = \langle u_1, u_2 \rangle, \quad \mathbf{w} = \langle w_1, w_2 \rangle, \quad \mathbf{h} = \langle h_1, h_2 \rangle, \quad |\mathbf{h}| = s.$$

Find h_1 , h_2 , and c (in terms of the given information) such that

$$\mathbf{h} + \mathbf{w} = c\mathbf{u}.$$

