

**Problem 1.25**

Consider the flow of air through a wind turbine whose blades sweep an area of diameter  $D$  (in m). The average air velocity through the swept area is  $V$  (in m/s). On the bases of the units of the quantities involved, show that the mass flow rate of air (in kg/s) through the swept area is proportional to air density, the wind velocity, and the square of the diameter of the swept area.