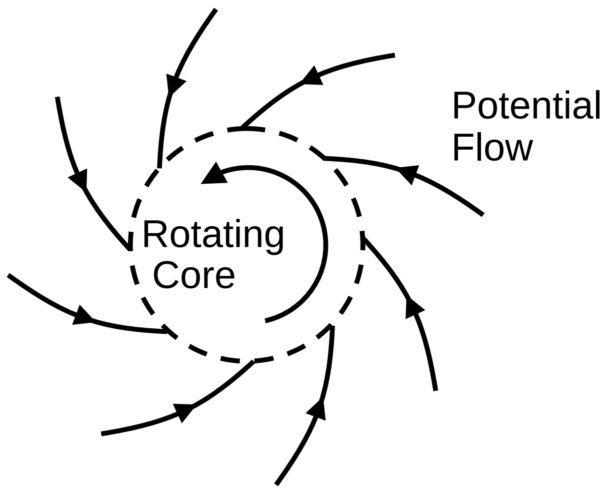
Problem 120C

A hurricane can be visualized as a planar incompressible flow consisting of a rotating circular core surrounded by a potential flow:



A particular hurricane has a core of radius $40m$ and air is sucked into this core at a volume flow rate per meter depth perpendicular to the diagram of 5000 m^2/s. Furthermore the pressure difference between the air far away from the hurricane and the air at the edge of the core is 1500 kg/m^2s. The velocity of the air far from the core is assumed to be negligible. The density of the air is assumed uniform and constant at 1.2 kg/m^3. Find the angular rate of rotation of the hurricane and the velocity of the wind at the edge of the core.