1014-U1-499   **Mike O'Leary*** (`moleary@towson.edu`), Department of Mathematics, Towson University, Towson, MD 21252. *Using Fluid Flow to Illustrate Properties of Vector Fields.*

We present a sequence of vector fields with real significance in fluid dynamics, and use the physical properties of the fluid flow to illustrate the mathematical concepts that we present. Our examples are two-dimensional, inviscid, incompressible flow, and each represents the two dimensional motion of a physical fluid like water, provided we ignore all effects arising from friction.

The examples are

- Flow around a cylinder,

- Point vortex flow around a cylinder,

- Flow around a cylinder with circulation,

- Flow in a corner,

- Flow in a closed channel, and

- Flow around a Rankine half-body.

For each example, we begin by describing the flow, graphing the vector field, and investigating how the different physical parameters change the flow. We then demonstrate how to find the equipotential curves and the streamlines for each flow. Next, we demonstrate how the objects placed in the fluid will be moved and distorted by the flow, using a sequence of animations. Finally we determine the corresponding pressure field for each flow, and use it to determine the force the fluid flow exerts on any obstacles in its path. (Received September 19, 2005)