Meeting: 998, Houston, Texas, SS 23A, Special Session on Curvature and Geodesics

998-53-293 **Colleen Robles*** (robles@math.rochester.edu), Department of Mathematics, University of Rochester, Rochester, NY 14627. *Time-efficient travel under windy conditions.*

Imagine traveling about a surface with constant speed. It is natural to ask, how can I travel from point P to point Q as quickly as possible? The answer is clear: take a path that minimizes distance between the two points.

Now suppose an external force acts up the traveller. For example, the external force might be a wind acting on a plane. The effect of this 'wind' is to push the flight off course. In order to reach the point Q as quickly as possible the pilot will select a course that avoids flying straight into a strong wind, and puts the wind behind the plane as much as possible. This time-efficient path will probably not minimize distance as before.

I will discuss the geometry associated to this 'navigation problem,' focusing on the special case when the 'wind' is represented by a Killing vector field. In this setting the paths of shortest time may be described explicitly. Graphics will be used to illustrate a variety of properties. (Received March 01, 2004)