

1056-Z1-1443      **S. L. Yap\*** (syap47@gmail.com), Math/CS Department, 25800 Carlos Bee Blvd., Hayward, CA 94114. *Visualizing and Utilizing the Symmetry Method for Differential Equations.*

The symmetry method is a powerful, beautiful, and widely applicable technique for integrating differential equations. The method, pioneered by Sophus Lie in the latter part of the twentieth century, exploits the invariance of the equation under certain transformations in order to find a coordinate system for which the equation simplifies greatly. For first-order ordinary differential equations, the method turns any differential equation with a continuous family of symmetries into a separable equation.

Many of the techniques taught to handle specific problems such as exact and homogeneous equations, are just instances of this method. In addition to explaining the method and applying the method to several non-linear ordinary differential equations, we highlight the geometric nature of the symmetry method with many graphics and animations. (Received September 21, 2009)