

Meeting: 1005, Newark, Delaware, SS 10A, Special Session on Symmetry Methods for Partial Differential Equations

1005-35-48 **Barbara Abraham-Shrauner*** (bas@wustl.edu), Electrical and Systems Engineering,
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differential equations.*

Hidden symmetries of Type II are analyzed for some partial differential equations (PDEs). Type I (II) hidden symmetries of PDEs occur when the total number of variables of the PDE is reduced by means of one symmetry and another symmetry is lost (gained). Type I hidden symmetries can be predicted by the properties of the Lie symmetries of the original PDE. The prediction of Type II hidden symmetries of the original PDE and reduced differential equations is more elusive. The Type II hidden symmetries of the 2-D and 3-D linear wave equations are analyzed. These examples were chosen since Stephani identified a Type II hidden symmetry in the ordinary differential equation (ODE) found in the successive reductions of the 3-D linear wave equation. Type II hidden symmetries of a nonlinear PDE are analyzed. Type II hidden symmetries of PDEs and ODEs are briefly compared.

1. H. Stephani, *Differential Equations, Their solutions using symmetries*, 1989, Cambridge University Press, Cambridge, UK. (Received January 21, 2005)