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**Douglas N. Arnold\***, School of Mathematics, 512 Vincent Hall, 206 Church St. SE, University of Minnesota, Minneapolis, MN 55455. *Stability, Consistency, and Convergence: Modern Variations on a Classical Theme.*

The accuracy of a numerical discretization of a mathematical problem depends on the consistency and stability of the discretization method used. This theme, that consistency and stability imply convergence, recurs throughout numerical analysis, and is especially important in the numerical solution of partial differential equations. But the concept of numerical stability can be subtle and elusive. Even simple examples can yield unexpected results, and the development of stable numerical methods remains elusive for important classes of problems. We will survey these ideas through a variety of examples, and describe some modern tools from geometry and topology which are taking their place along side the more classical analytic tools for designing and understanding stable algorithms. (Received September 14, 2008)