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Teaching Vector Analysis to the Computer REBECCA PETRICK, CHARLES TORRE, Utah State University — *Differential Geometry* (DG) is a Maple software package which symbolically performs fundamental operations of calculus on manifolds, differential geometry, tensor calculus, Lie algebras, Lie groups, transformation groups, jet spaces, and variational calculus. In physics, DG has been used principally for research and educational activities in relativity and field theory. Using DG, we have developed a suite of commands for vector analysis in three dimensions. These commands allow one to easily compute the gradient, divergence, cross product, curl and Laplacian in *any* three dimensional coordinate system, and even for curved three-dimensional geometries. We have built a digital library of the most popular 14 orthogonal coordinate systems in Euclidean space. Using this library, we have computed all the relevant vector operations, and corrected some errors in common literature.

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