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Jeffrey K. Lawson* (jlawson@wcu.edu), Department of Mathematics & Computer Science,
Western Carolina University, Cullowhee, NC 28723. *Symplectic discretization of ODEs using the
geometry of time*. Preliminary report.

The natural geometry of ODEs is the symplectic geometry of phase space. We approach symplectic geometry from the viewpoint of the geometry of the space of time parameters. This geometry is based upon the deRham cohomology of the parameter space, and it possesses a canonical one-form not unlike that of the cotangent bundle of extended configuration space. This new geometrical structure naturally gives rise to Hamilton's equations and is the launching point for symplectic discretization schemes. Furthermore, this technique shows promise for multisymplectic discretization schemes for PDEs. (Received January 08, 2007)