1027-34-68 **Lance Lee Littlejohn*** (Lance_Littlejohn@baylor.edu), Department of Mathematics, Baylor University, Waco, TX 76798-7328, **Andrea Bruder** (Andrea_Bruder@baylor.edu), Department of Mathematics, Baylor University, Waco, TX 76798-7328, and **Davut Tuncer** (Davut_Tuncer@baylor.edu), Department of Mathematics, Baylor University, Waco, TX 76798-7328. *Lagrange-Sobolev Adjoints and Lagrange-Sobolev Symmetry of Ordinary Differential Expressions.* Preliminary report.

In this talk, we consider ordinary differential expressions $\ell[\cdot]$ in the Hilbert-Sobolev space generated by the inner product

$$(f,g)_1 = \int_I f\overline{g} + \int_I f'\overline{g'}.$$

In particular we find the explicit formula for the adjoint $\ell^+[\cdot]$, which we call the Lagrange-Sobolev adjoint, of $\ell[\cdot]$ in this space. Furthermore, we characterize all differential expressions $\ell[\cdot]$ that are Lagrange-Sobolev symmetric in the sense that $\ell[\cdot] = \ell^+[\cdot]$. This work was motivated by the example given in [1] in which a fourth-order differential expression is produced that is not Lagrange symmetric in the classical sense but it generates a self-adjoint operator in a certain Hilbert-Sobolev space. Several examples will be considered to illustrate the main results.

[1] *Self-adjoint operators generated from non-Lagrangian symmetric differential equations having orthogonal polynomial eigenfunctions,* (with W.N. Everitt, K.H. Kwon, J.K. Lee, and S.C. Williams), **Rocky Mountain J. Math.,** 31(3), 899-937, 2001. (Received February 14, 2007)