1023-58-1005 **Wen-Xiu Ma*** (`mawx@cas.usf.edu`), Department of Mathematics, University of South Florida, 4202 E Fowler Avenue, Tampa, FL 33620-5700. *Integrable Couplings and Semi-Direct Sums of Lie Algebras.*

Semi-direct sums of Lie algebras are used to construct integrable couplings of soliton equations. The corresponding Hamiltonian structures are generated by a variational identity involving degenerate Killing forms associated with non-semi-simple Lie algebras. An application of the resulting theory to the AKNS and Toda spectral problems leads to novel hierarchies of integrable couplings of the AKNS and Toda soliton equations. The construction of integrable couplings using semi-direct sums of Lie algebras not only provides a good source of information on integrable systems themselves, but also is an inevitable step towards complete classification of integrable systems. (Received September 24, 2006)