1035-70-1776 **F. J. Lin*** (fjlin@usc.edu), University of Southern California, Department of Mathematics, KAP 108, 3620 S. Vermont Avenue, Los Angeles, CA 90089-2532. *Applications of reduction in the separation of overall rotation and internal motion in the Hamiltonian dynamics of a three-body system.* Preliminary report.

A condition for the separation of overall rotation and internal motion in the Hamiltonian dynamics of a three-body system is described in relation to the conservation of total linear momentum and to the conservation of total rotational angular momentum. A reduced Hamiltonian for the three-body problem is used in separating the energies of overall rotation and internal motion. It is also used in separating the coordinates and describing the dynamics on a reduced phase space. At zero total rotational angular momentum, the net overall rotation has been described in terms of a connection, a rotation of 20 degrees has been observed in an experimental photodissociation of a triatomic molecule, and an overall rotation of 42 degrees has been observed in a computational molecular dynamics study of a protein. Regardless of whether the total rotational angular momentum vanishes, the net overall rotation due to internal motion is described here as the holonomy of a connection and leads to a condition for the separation of overall rotation and internal motion. (Received September 20, 2007)