Coupling Algorithm for $Sp(3,R)$ **Irreducible Representations**[1]
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— The nuclear symplectic model based on
$Sp(3,R)$ – the smallest algebra that contains both the shell model Hamiltonian
and the rotor algebra – connects the microscopic shell model to collective rotational
behavior and naturally extends the Elliot SU(3) model to multiple shells. However,
$Sp(3,R)$ is only an approximate symmetry of the nucleus, where the symmetry can
be broken by spin-orbit interactions, tensor force interactions, and pairing. The
Hamiltonians in most physical situations will the break $Sp(3,R)$ symmetry, causing
their eigenstates to become linear combinations of symplectic irreducible representa-
tions (irreps). Calculations with those eigenstates will then involve multiple irreps.
We report a computer algorithm for coupling symplectic irreps that should assist
in performing such multi-irrep calculations and facilitate computing symplectic cou-
pling coefficients.

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Date submitted: 24 Jul 2014   Electronic form version 1.4