DIFFERENT FORMS OF EFFECTIVE HAMILTONIANS

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An *effective Hamiltonian* is a Hamiltonian that has been transformed so that the only matrix elements are block-diagonal within nearly-degenerate sets of states. Two particular forms of effective Hamiltonians are based on proposals by Van Vleck[a] and by Claude Bloch;[b] a recent summary has been given by Brown and Carrington.[c] The Van Vleck (or contact transformation) and Bloch effective Hamiltonians are typically expressed in terms of commutators and projection operators, respectively. A problem with the Bloch effective Hamiltonian is that it is not Hermitian, and so contains extra (and indeterminate) parameters when used for fitting spectra. This work considers the adaptation of the Bloch method to give Hermitian effective Hamiltonians, and the relation of them to the Hermitian effective Hamiltonians obtained by contact transformations.

[a] J. H. Van Vleck, *Phys. Rev.* **33**, 467 (1929)
[b] C. Bloch, *Nucl. Phys.* **6**, 329 (1958)
[c] J. M. Brown and A. Carrington, *Rotational Spectroscopy of Diatomic Molecules*, Cambridge University Press (2003)