**branching plane**

At a conical intersection point, the plane spanned by the gradient difference vector \(x_1\) and the gradient of the interstate coupling vector \(x_2\):

\[
x_1 = \frac{\partial (E_2 - E_1)}{\partial Q} q
\]

\[
x_2 = < C_1^\dagger \left( \frac{\partial H}{\partial Q} \right) C_2 > q
\]

where \(C_1\) and \(C_2\) are the configuration interaction eigenvectors (i.e., the excited and ground-state adiabatic wavefunctions) in a conical intersection problem, \(H\) is the conical intersection Hamiltonian, \(Q\) represents the nuclear configuration vector of the system, and thus \(q\) is a unit vector in the direction of vector \(q\). \(E_1\) and \(E_2\) are the energies of the lower and upper states, respectively.

Note:
The branching plane is also referred to as the \(g-h\) plane. Inspection of \(x_1\) and \(x_2\) provides information on the geometrical deformation imposed on an excited state molecular entity immediately after decay at a conical intersection. Consequently, these vectors provide information on the ground-state species that will be formed after the decay.

**Source:**
PAC, 2007, 79, 293 (Glossary of terms used in photochemistry, 3rd edition (IUPAC Recommendations 2006)) on page 309