Spherical harmonic rotation matrices (from Messiah):

Where .

Half-angle formulas:

*t* runs over the set of values for which the factorials are ≥ 0.

Taking the natural log of the factorials,

The terms not involving *t* can be moved outside of the sum:

Where

Symmetry properties:

Special cases:

Tabulating some r’s:

For ℓ=2;