$U_p(4) \times U_q(4)$

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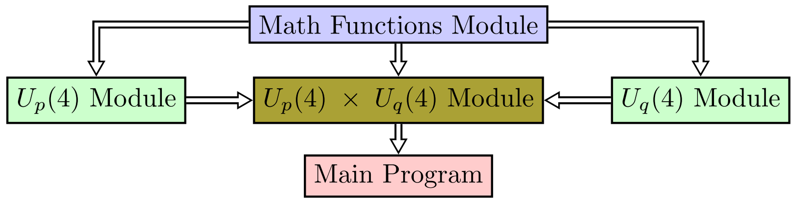

0.1 Math Functions Module $\rightarrow$ `MOD_matfun.f90`

- Functions:
  - `p_symbol`(a,b) $= (a)_s = a(a+1)...(a+s-1)$

0.2 $U_p(4)$ Module $\rightarrow$ `MOD_Up4.f90`

Hamiltonian:

$$\hat{H}_{U_p(4)} = \beta\, \mathcal{C}_2\left[so_p(4)\right] + \gamma\, \mathcal{C}_2\left[so_p(3)\right] + \gamma_2\, \left[\mathcal{C}_2\left[so_p(3)\right]\right]^2 + \kappa\, \mathcal{C}_2\left[so_p(4)\right] \mathcal{C}_2\left[so_p(3)\right] \tag{1}$$

- Global definitions:
  - Npval: $U(4)$ Totally symmetric representation.
- Functions:
  - Function: `RME_Casimir_SOp4`
  - Function: `RME_Casimir_SOp3`
  - Function: `RME_Qp2`

0.3 $U_q(4)$ Module $\rightarrow$ `MOD_Uq4.f90`

Hamiltonian:

$$\hat{H}_{U_q(4)} = a\, \mathcal{C}_1\left[u_q(3)\right] + b\, \mathcal{C}_2\left[u_q(3)\right] + c\, \mathcal{C}_2\left[so_q(3)\right] + d\, \mathcal{C}_2\left[so_q(4)\right] \tag{2}$$

- Global definitions:
  - Nqval: $U(4)$ Totally symmetric representation.
- Functions:
  - Function: `RME_Casimir_Uq3`
  - Function: `RME_Casimir_SOq3`
  - Function: `RME_Casimir_SOq4`
  - Function: `RME_Qq2`

0.4 $U_p(4) \times U_q(4)$ Module → `MOD_Up_x_Uq.f90`