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Young tableaux	$\square \times \square =$	$\bullet$	+	$\begin{array}{ c } \hline \square \\ \hline \end{array}$	+	$\begin{array}{ c c } \hline \square & \square \\ \hline \end{array}$
Dimensions	$n^2 =$	1	+	$\frac{n(n-1)}{2}$	+	$\frac{(n+2)(n-1)}{2}$
Projectors	$\overline{\quad} = \frac{1}{n} \curvearrowright$	$\curvearrowleft$	+	$\overline{\quad} \overline{\quad}$	+	$\left\{ \overline{\quad} \overline{\quad} - \frac{1}{n} \curvearrowright \right\} \curvearrowleft$

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Table 11.1:  $SO(n)$  Clebsch-Gordan series for  $V \otimes V$ , worked out in detail in *Group Theory – Birdtracks, Lie’s, and Exceptional Groups*, Chapt. 10 *Orthogonal groups*.

## 11.4 Irreps of $SO(n)$

The dimension of  $SO(n)$  is given by the trace of the adjoint projection operator:

$$N = \text{tr } \mathbf{P}_A = \begin{array}{c} \circ \\ | \\ \circ \end{array} = \frac{n(n-1)}{2}. \quad (11.17)$$

Dimensions of the other reps are listed in table 11.1.

- [1] P. Cvitanović, *Group Theory: Birdtracks, Lie’s and Exceptional Groups* (Princeton Univ. Press, Princeton NJ, 2004).