The double dot product of two tensors results in a scalar:

$$\underline{\underline{\mathbf{T}}}:\underline{\underline{\mathbf{U}}} = \begin{array}{ccc} T_{11}U_{11}+ & T_{12}U_{21}+ & T_{13}U_{31}+ \\ T_{21}U_{12}+ & T_{22}U_{22}+ & T_{23}U_{32}+ \\ T_{31}U_{13}+ & T_{32}U_{23}+ & T_{33}U_{33} \end{array} = \sum_{i=1}^{3}\sum_{j=1}^{3} T_{ij}U_{ji} \ .$$