There are several equivalent terms and notations for this product:

- the **dyadic product** of two vectors $\mathbf{a}$ and $\mathbf{b}$ is denoted by $\mathbf{ab}$ (juxtaposed; no symbols, multiplication signs, crosses, dots, etc.)
- the **outer product** of two column vectors $\mathbf{a}$ and $\mathbf{b}$ is denoted and defined as $\mathbf{a} \otimes \mathbf{b}$ or $\mathbf{ab}^\mathsf{T}$, where T means transpose,
- the **tensor product** of two vectors $\mathbf{a}$ and $\mathbf{b}$ is denoted $\mathbf{a} \otimes \mathbf{b}$,

In the dyadic context they all have the same definition and meaning, and are used synonymously, although the **tensor product** is an instance of the more general and abstract use of the term.

Dirac's bra–ket notation makes the use of dyads and dyadics intuitively clear, see Cahill (2013)[dubious – discuss].

Three-dimensional Euclidean space [edit]

To illustrate the equivalent usage, consider three-dimensional Euclidean space, letting:

$$\begin{aligned}\mathbf{a} &= a_1\mathbf{i} + a_2\mathbf{j} + a_3\mathbf{k}\\ \mathbf{b} &= b_1\mathbf{i} + b_2\mathbf{j} + b_3\mathbf{k}\end{aligned}$$

be two vectors where **i**, **j**, **k** (also denoted $\mathbf{e}_1$, $\mathbf{e}_2$, $\mathbf{e}_3$) are the standard basis vectors in this vector space (see also Cartesian coordinates). Then the dyadic product of **a** and **b** can be represented as a sum:

$$\begin{aligned}\mathbf{ab} = \qquad &a_1b_1\mathbf{ii} + a_1b_2\mathbf{ij} + a_1b_3\mathbf{ik}\\ {}+{} &a_2b_1\mathbf{ji} + a_2b_2\mathbf{jj} + a_2b_3\mathbf{jk}\\ {}+{} &a_3b_1\mathbf{ki} + a_3b_2\mathbf{kj} + a_3b_3\mathbf{kk}\end{aligned}$$

or by extension from row and column vectors, a 3×3 matrix (also the result of the outer product or tensor product of **a** and **b**):

$$\mathbf{ab} \equiv \mathbf{a} \otimes \mathbf{b} \equiv \mathbf{ab}^\mathsf{T} = \begin{pmatrix} a_1 \\ a_2 \\ a_3 \end{pmatrix} \begin{pmatrix} b_1 & b_2 & b_3 \end{pmatrix} = \begin{pmatrix} a_1b_1 & a_1b_2 & a_1b_3 \\ a_2b_1 & a_2b_2 & a_2b_3 \\ a_3b_1 & a_3b_2 & a_3b_3 \end{pmatrix}.$$

ισοδύναμα
σύμβολα
γινομένου