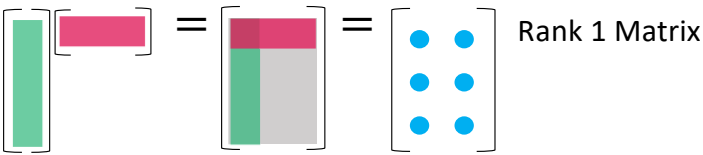
v1

v2



Dot product ($\boldsymbol{a} \cdot \boldsymbol{b}$) is expressed as $\boldsymbol{a}^{\mathrm{T}}\boldsymbol{b}$ in matrix language and yields a number.

$\boldsymbol{ab}^{\mathrm{T}}$ is a matrix ($\boldsymbol{ab}^{\mathrm{T}} = A$). If neither a, b are 0, the result A is a rank 1 matrix.

$$\begin{bmatrix}1 & 2 & 3\end{bmatrix}\begin{bmatrix}x_1\\x_2\\x_3\end{bmatrix} = \begin{bmatrix}1\\2\\3\end{bmatrix} \cdot \begin{bmatrix}x_1\\x_2\\x_3\end{bmatrix} = x_1 + 2x_2 + 3x_3$$

$$\begin{bmatrix}1\\2\\3\end{bmatrix}\begin{bmatrix}x & y\end{bmatrix} = \begin{bmatrix}x & y\\2x & 2y\\3x & 3y\end{bmatrix}$$