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vectorization of matrix

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The *vectorization* of a  $m \times n$  matrix  $A = (a_{ij})$  the matrix to a column vector  $\text{vec}(A)$ , which consists of all columns of  $A$  stacked in :

$$\text{vec}(A) := (a_{11} \ a_{21} \ \dots \ a_{m1} \ a_{12} \ a_{22} \ \dots \ a_{m2} \ \dots \ a_{1n} \ a_{2n} \ \dots \ a_{mn})^\top$$

The mapping  $\text{vec}$  from the vector space formed by the  $m \times n$  matrices to the vector space of the column vectors of the  $mn$  is apparently a linear transformation.