

ML & LinAlg Math Cheat Sheet

October 24, 2017

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1 Notation

Vectors are column vectors denoted by lower-case bolded variables, such that

$$\mathbf{x} = \begin{bmatrix} x_1 \\ \vdots \\ x_N \end{bmatrix}.$$

A row vector is denoted $\mathbf{x}^\top = [x_1 \dots x_N]$. A matrix is indicated by a bolded upper-case variable, such that an $N \times M$ matrix is

$$\mathbf{A} = \{a_{ij}\} = [\mathbf{a}_1 \dots \mathbf{a}_M] = \begin{bmatrix} \mathbf{a}_1^\top \\ \vdots \\ \mathbf{a}_N^\top \end{bmatrix} = \begin{bmatrix} a_{1,1}^\top & \dots & a_{1,M}^\top \\ \vdots & \ddots & \vdots \\ a_{N,1}^\top & \dots & a_{N,M}^\top \end{bmatrix}.$$

2 Trace Operator

2.a Derivative

2.b Relation to Determinant