

# *Advanced Machine Learning*

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Note that these are not the official lecture notes of the course, but only notes written by a student of the course. As such, there might be mistakes. The source code can be found at [github.com/cristianpjensen/eth-cs-notes](https://github.com/cristianpjensen/eth-cs-notes). If you find a mistake, please create an issue or open a pull request.

*Contents*

*List of symbols*

$\doteq$	Equality by definition
$\approx$	Approximate equality
$\propto$	Proportional to
$\mathbb{N}$	Set of natural numbers
$\mathbb{R}$	Set of real numbers
$i : j$	Set of natural numbers between $i$ and $j$ . <i>I.e.</i> , $\{i, i+1, \dots, j\}$
$f : A \rightarrow B$	Function $f$ that maps elements of set $A$ to elements of set $B$
$\mathbb{1}\{\text{predicate}\}$	Indicator function (1 if predicate is true, otherwise 0)
$\boldsymbol{v} \in \mathbb{R}^n$	$n$ -dimensional vector
$\boldsymbol{M} \in \mathbb{R}^{m \times n}$	$m \times n$ matrix
$\boldsymbol{M}^\top$	Transpose of matrix $\boldsymbol{M}$
$\boldsymbol{M}^{-1}$	Inverse of matrix $\boldsymbol{M}$
$\det(\boldsymbol{M})$	Determinant of $\boldsymbol{M}$
$\frac{\mathrm{d}}{\mathrm{d}x}f(x)$	Ordinary derivative of $f(x)$ w.r.t. $x$ at point $x \in \mathbb{R}$
$\frac{\partial}{\partial \boldsymbol{x}}f(\boldsymbol{x})$	Partial derivative of $f(\boldsymbol{x})$ w.r.t. $\boldsymbol{x}$ at point $\boldsymbol{x} \in \mathbb{R}^n$
$\nabla_{\boldsymbol{x}}f(\boldsymbol{x}) \in \mathbb{R}^n$	Gradient of $f : \mathbb{R}^n \rightarrow \mathbb{R}$ at point $\boldsymbol{x} \in \mathbb{R}^n$
$\nabla_{\boldsymbol{x}}^2f(\boldsymbol{x}) \in \mathbb{R}^{n \times n}$	Hessian of $f : \mathbb{R}^n \rightarrow \mathbb{R}$ at point $\boldsymbol{x} \in \mathbb{R}^n$



## *References*