Bishop - Pattern Recognition and Machine Learning

Mathematical Notations :

- Vectors are denoted by lower case bold Roman letters such as $\mathbf{x}$, and all vectors are assumed to be colum vectors.
- A Superscript T denotes the transpose of a matrix or vector, so $\mathbf{x}^T$ will be a row vector. Uppercase bold $\mathbf{M}$ denotes a Matrix.
- $\mathbf{w} = (w_1, w_2 \ldots w_M)^T$ denotes a column vector with M elements.
- $[a, b]$ denotes closed interval and (a, b) denotes open interval. $(a, b]$ denotes open or exclusive a but closed or inclusive b.
- The notation $g(x) = O(f(x))$ denotes that $|f(x)/g(x)|$ is bounded as $x \to \infty$, for instance $g(x) = 3x^2 + 2$ then $g(x) = O(x^2)$. This is also called as Big-O notation.
- The expectation of function $f(x, y)$ with respect to a random variable x is denoted by $E_x[f(x, y)]$. When there is not any ambiguity as to which variable is being averaged, we write without suffix, ex $E[x]$.
- If distribution of x is conditioned an another variable z, then corresponding conditional Expectation will be written as $E_x[f(x) | z]$.
- Variance is denoted by $var[f(x)]$ and covariance is written as $cov[x, y]$. We write $cov[x]$ as shorthand for $cov[x, x]$.