Glossary of Notation

Graph Notation

$G = (V, E)$	A graph G, with vertex set V and edge set E.
N_v, N_e	Number of vertices; number of edges.
$\mathscr{G}$	A collection of graphs.
$V^m, V^{(m)}$	Set of ordered/unordered vertex m-tuples.
$V^{(m)}_{\setminus\{i,j\}}$	Set of unordered vertex m-tuples from $V \setminus \{i, j\}$.
$\mathbf{A} = [A_{ij}]_{i,j=1}^{N_v}$	Adjacency matrix.
$\mathbf{B}$	Routing matrix (more generally, incidence matrix).
$\mathbf{L}, \tilde{\mathbf{L}}$	Laplacian and normalized Laplacian matrices.
$\{d_v\}_{v \in V}$	Degree sequence.
$\mathsf{dist}(v, u)$	Geodesic distance between v and u.
$\bar{l}(G)$	Average geodesic distance on G.
$c_{Cl}(v), c_B(v), c_{Ei}(v)$	Closeness, betweenness, and eigenvector centrality of v.
$\mathsf{den}(G)$	Density of G.
$\tau_3(G)$	Number of connected triples of vertices in G.
$\tau_\triangle(G)$	Number of triangles in G.
$\mathsf{cl}(G), \mathsf{cl}_T(G)$	Clustering and clustering-transitivity coefficient of G.
$\mathscr{C} = \{C_1, \ldots, C_K\}$	A partition (e.g., of a set of vertices).
$\mathsf{mod}(\mathscr{C})$	Modularity of the partition $\mathscr{C}$.
$\mathscr{N}(S)$	Neighborhood of vertices in S.
$\mathscr{N}_v = \mathscr{N}(\{v\})$	Neighborhood of vertex v.
$\mathscr{N}_v^+ = \mathscr{N}_v \cup \{v\}$	Union of vertex v with its neighborhood.
$\eta(G)$	Characteristic of G (e.g., average degree, clustering coefficient, etc.).
$G^* = (V^*, E^*)$	Graph obtained by sampling G.
$T = (V_T, E_T)$	A tree.

Probability and Statistics Notation

$\mathbb{P}(B)$	Probability of the event B.
$X, \mathbf{X}$	Random variable; random vector or matrix.
$x, \mathbf{x}$	Observation of X or $\mathbf{X}$.
$\mathbf{X}_{(-i)}, \mathbf{X}^{(-i)}$	Random vector $\mathbf{X}$ without its i-th entry.
I_B	Indicator random variable for the event B.
F_X	Cumulative distribution function (CDF), i.e., $F_X(x) = \mathbb{P}(X \leq x)$.
f_X	Probability density (or mass) function.
$\mathbb{E}(X)$	Expected value (mean) of X; sometimes written ${}_X$.
$\mathbb{V}(X)$	Variance of X i.e., $\mathbb{E}((X - {}_X)^2)$
$\mathsf{Cov}(X,Y)$	Covariance of X and Y i.e., $\mathbb{E}((X - {}_X)(Y - {}_Y))$
$\mathsf{corr}(X,Y)$	Correlation of X and Y i.e., $\mathsf{Cov}(X,Y)/(\mathbb{V}(X)\mathbb{V}(Y))^{1/2}$.
$\bar{X}, \bar{x}$	Sample mean; observed sample mean.
$\theta, \hat{\theta}$	Parameter; estimate of parameter.
$\mathsf{se}(\hat{\theta})$	Standard error of $\hat{\theta}$ i.e., $\mathsf{se}(\hat{\theta}) = \sqrt{\mathbb{V}(\hat{\theta})}$).
$\mathsf{MSE}(\hat{\theta})$	Mean squared error of $\hat{\theta}$ i.e., $\mathsf{MSE}(\hat{\theta}) = \mathbb{E}((\hat{\theta} - \theta)^2)$.
$\mathscr{L}(\theta)$	Likelihood function.
$\ell(\theta)$	Log-likelihood function i.e., $\ell(\theta) = \log \mathscr{L}(\theta)$.
RSS	Residual sum of squares.
FDR	False discovery rate.

Other Notation

$n!$	$n \times (n-1) \times \cdots \times 2 \times 1$
$\binom{n}{k}$	$n!/(k!(n-k)!)$
$\mathbb{R}$	The real numbers.
$\lvert S \rvert$	Number of elements in the set S.
$h_n = O(g_n)$	$\lvert h_n/g_n \rvert$ is bounded for large n.
NP	A formal characterization in computer science of the difficulty of a problem, effectively indicating that it may be solved only in a number of computations growing exponentially with the size of the problem.
$\mathbf{x}^T$	Transpose of the vector $\mathbf{x}$.

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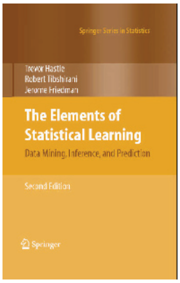

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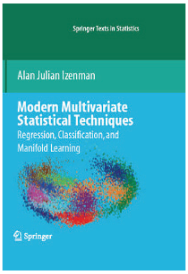

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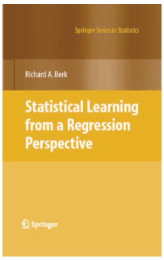

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