overbooking limit (virtual capacity). Vector of such state variables or capacities. Finally, used as capacity- or quantity-choice variable in economic models.

$y, y_j, \mathbf{y}$ Allocation variable or protection level for product j; vector of allocations or protection levels. Used in models for finding partitioned or nested allocations. Also the state variable (number of reservations on hand) in overbooking models.

z_t Notation used in forecasting. Data value of a forecast observed at time t (realization of random variable Z_t).

$\hat{z}_t$ Notation used in forecasting. Forecast (point estimate) of time-series value at time t (estimate of unrealized value Z_t).

Z_t Notation used in forecasting. The t^{th} random variable in a time series $Z_1, Z_2, \ldots$.

$Z(x), Z(y)$ Number of customers who show up (number of survivals) from a given number x, y of reservations on hand. Used in overbooking models.

$\bar{Z}(x)$ Number of customers who cancel from a given number x of reservations on hand; $\bar{Z}(x) = x - Z(x)$.

Greek Variables

λ, λ_j An arrival rate in a deterministic demand model and arrival intensity or arrival probability in a probabilistic-demand model.

Δ The first-difference operator; if $g(x)$ is a function, then $\Delta g(x) = g(x) - g(x-1)$.

$\epsilon(p), \epsilon_{ij}(\mathbf{p})$ The elasticity of demand; the cross-price elasticity of demand for product i with respect to the price of product j.

μ The mean of a random variable.

$\Omega, \Omega_p, \Omega_d$ A constraint set; the contraint set of prices p and demand rates d.

$\pi_i, \pi_i(x), \pi$ A bid price value or function—or a dual price from a math program.

σ The variance of a random variable.

θ A generic parameter of a distribution or a scaling parameter.

$\Phi(z)$ The standard normal distribution (i.e., $\Phi(z) = \int_{-\infty}^{x} \frac{1}{\sqrt{2\pi}} e^{-z/2} dz$).

$\phi(z)$ The standard normal density (i.e., $\phi(z) = \frac{1}{\sqrt{2\pi}} e^{-\frac{z}{2}}$).

$\psi_X(t)$ The moment-generating function of a random variable X.

ω An elementary outcome in a probability space (e.g., a random variable is $X(\omega)$).

Miscellaneous Symbols and Notation

$\Re, \Re_+, \Re^n, \Re^n_+$ The set of real numbers $(+\infty, +\infty)$; the set of nonnegative real numbers $[0, +\infty)$; the n-dimensional real plane and the n-dimensional positive orthant.

$\mathcal{Z}$ The set of integers, $\{\ldots, -2, -1, 0, 1, 2, \ldots\}$.

$\mathbf{x}^\top, \mathbf{A}^\top$ The transpose of a vector x or a matrix $\mathbf{A}$.

$x^+, (a-b)^+$ The positive part of x equal to $\max\{0, x\}$; the positive part of the quantity $(a-b)$.

$x^-, (a-b)^-$ The negative part of x equal to $\max\{0, -x\}$; the negative part of the quantity $(a-b)$.