Answers to Selected Problems

Problem 2.1

(c) $\mathbf{S} = (3,2,1)$, $EBO(\mathbf{S}) = 0.1205$, $C(\mathbf{S}) = 8,300$ Euros

Problem 3.2

(c) $(S_A, S_B) = (3,3)$, $\hat{C}(S_A, S_B) = 892.7$ Euros/month, $W(S_A, S_B) = 0.1548$ days per demand

(d) Total average costs: 2,138 Euros/month, Increase: 388 Euros/month

Problem 4.2

$\mathbf{h}^* = (0,1)$, 644.26 Euros/month

Problem 4.3

(b) (0,0) is optimal for $0.1304 \leq \alpha < 1$, (0,1) is optimal for $0.0569 \leq \alpha \leq 0.1304$, (0,2) is optimal for $0 < \alpha \leq 0.0569$

Problem 5.1

(b) $\pi(0,0) = \frac{2}{37}$, $\pi(0,1) = \frac{5}{37}$, $\pi(1,0) = \frac{5}{37}$, $\pi(1,1) = \frac{25}{37}$

Problem 5.2

(b) $\pi(0,0) = 0.0881$, $\pi(0,1) = 0.1444$, $\pi(1,0) = 0.1976$, $\pi(1,1) = 0.5699$

G.J. van Houtum, B. Kranenburg, *Spare Parts Inventory Control under System Availability Constraints*, International Series in Operations Research & Management Science 227, DOI 10.1007/978-1-4899-7609-3

Problem 5.5

(b) $\beta = \frac{2+4m+3m^2}{2+6m+9m^2+9m^3}$, $\theta = \frac{9m^3}{2+6m+9m^2+9m^3}$, $A = \frac{2m+6m^2}{2+6m+9m^2+9m^3}$

Problem 6.1

(a) $\hat{S} = 4$, $S_{\text{tot}}^{(1)} = 24$, Corresponding mean waiting time: 0.0022 years
(b) 0.0004 years
(c) 7; 13; 11

Problem 7.1

$W_{1,0}(\mathbf{S}) = 0.0203$ months

Problem 8.2

(a) $L^1 = 9$
(b) The probabilities $P_j^1(\mathbf{U}_3)$ for $j = 0, \ldots, 6$ are as follows: 0.11765, 0.10381, 0.09159, 0.08082, 0.07131, 0.06292, 0.05552
(c) The probabilities $P_j^2(\mathbf{U}_3)$ for $j = 0, 1, 2$ are as follows: 0.4, 0.24, 0.144

Problem 8.3

(c) 0.1322

Index

G.J. van Houtum, B. Kranenburg, *Spare Parts Inventory Control under System Availability Constraints*, International Series in Operations Research & Management Science 227, DOI 10.1007/978-1-4899-7609-3