

Appendix FEIR-5

M/M/s Queuing Model

Queuing M/M/s (Multi-Channel)

Arrival rate, lambda 178 customers/hou
 Mean service time, miu 380 customers/hou
 Number of servers, s 1 (max = 50)

Economic Analysis of Queue

Waiting cost per time period per each unit, Cw 1 \$/Hour
 Service cost per time period for each channel, Cs 1 \$/Hour

Queuing Performances

utilization single server, rho 0.468421053
 Utilization factor, U 47% OK
 Prob. Empty system, P0 53%
 Average queue length Lq 0.4128 customers
 Average system length L 0.8812 customers
 Average waiting in queue Wq 0.0023 hour =
 Average waiting in system W 0.0050 hour =
 Prob. of waiting 46.84%
Optimum number of servers 1

Number of customers	Probability	Sum
0	53.16%	53.16%
1	24.90%	78.06%
2	11.66%	89.72%
3	5.46%	95.19%
4	2.56%	97.74%
5	1.20%	98.94%
6	0.56%	99.51%
7	0.26%	99.77%
8	0.12%	99.89%
9	0.06%	99.95%
10	0.03%	99.98%
11	0.01%	99.99%
12	0.01%	99.99%
13	0.00%	100.00%
14	0.00%	100.00%
15	0.00%	100.00%
16	0.00%	100.00%
17	0.00%	100.00%
18	0.00%	100.00%
19	0.00%	100.00%
20	0.00%	100.00%
21	0.00%	100.00%
22	0.00%	100.00%
23	0.00%	100.00%
24	0.00%	100.00%
25	0.00%	100.00%
26	0.00%	100.00%
27	0.00%	100.00%
28	0.00%	100.00%
29	0.00%	100.00%
30	0.00%	100.00%
31	0.00%	100.00%
32	0.00%	100.00%
33	0.00%	100.00%
34	0.00%	100.00%
35	0.00%	100.00%
36	0.00%	100.00%
37	0.00%	100.00%
38	0.00%	100.00%
39	0.00%	100.00%
40	0.00%	100.00%
41	0.00%	100.00%
42	0.00%	100.00%
43	0.00%	100.00%
44	0.00%	100.00%
45	0.00%	100.00%
46	0.00%	100.00%
47	0.00%	100.00%
48	0.00%	100.00%
49	0.00%	100.00%
50	0.00%	100.00%
>50	0.00%	100.00%
Sum	100.00%	

This workbook is a companion of **Kardi Teknomo's tutorial** on

Queuing Theory

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