

Multiple server queues with General service time distributions

Using the setting of the M/M/c exercises, now consider the service generally distributed, according to the distribution given in the provided table. Consider a FCFS queue, so that the system is M/G/c : use the Pollaczek–Khinchine formula for the M/G/1 case, and the approximation provided by the Kingsman formula for $c > 1$. Limit the analysis up to $c=4$.

For each arrival rate (51 equally spaced points, as in the previous exercises) / number of servers couple determine:

- If the system stable
- The average response time (if possible)
- The average time spent in queue (if possible)
- The average queue length of the system (if possible)

Chose the appropriate set of model parameters according to the last two digits on the right (the least significant) of your “Codice Persona”. **This exercise is mandatory and must be presented at the exam!**

Which					Servie	Arrival Rate [job/sec.]	
Last digitis of "Codice Persona"					Time [sec.]	min	max
00	20	40	60	80	Hyper<0.5,1.5,p1=0.25>	1	8
01	21	41	61	81	Uniform<0.2,1.8>	0.5	12
02	22	42	62	82	Hypo<0.5,0.125>	0.02	0.8
03	23	43	63	83	Erlang<4,2>	0.5	5
04	24	44	64	84	Hyper<0.05,0.15,p1=0.25>	0.02	0.6
05	25	45	65	85	Uniform<2,18>	0.4	1
06	26	46	66	86	Hypo<1,0.25>	0.04	4
07	27	47	67	87	Erlang<4,0.4>	0.02	1.2
08	28	48	68	88	Hyper<0.05,0.15,p1=0.25>	0.05	0.5
09	29	49	69	89	Uniform<1,9>	0.04	2
10	30	50	70	90	Hypo<2.5,0.625>	2	3
11	31	51	71	91	Erlang<4,0.8>	0.4	2.4
12	32	52	72	92	Hyper<0.25,0.75,p1=0.25>	0.1	10
13	33	53	73	93	Uniform<2,18>	0.4	0.5
14	34	54	74	94	Hypo<5,1.25>	4	10
15	35	55	75	95	Erlang<4,2>	1	2.5
16	36	56	76	96	Hyper<0.05,0.15,p1=0.25>	0.2	0.5
17	37	57	77	97	Uniform<0.2,1.8>	4	6
18	38	58	78	98	Hypo<1,0.25>	0.04	2.4
19	39	59	79	99	Erlang<4,2>	1	10
Friday class					Hypo<1,0.25>	0.2	2
Monday					Erlang<4,0.4>	0.4	0.8