Mean Value Analysis

Let us consider a time sharing system, with the think time, visits, average service times and number of jobs as specified in the included table.

Determine for each station:

- *Utilization*
- *Throughput*
- *Average number of jobs in the station*
- *Average queue size (excluding the job in service)*
- *Average Response Time*
- *Average Residence Time*
- *Average Time spent in queue (during one visit)*

Compute for the entire system:

- *System Throughput*
- *Average number of jobs not thinking*
- *Average System response time*

Compare the solutions obtained with exact MVA, with the ones obtained with approximate MVA, and answer the following questions

- *Which is the error of the approximate MVA with respect to the exact one?*
- *How many iterations are required to have a maximum error of 10^{-5} ?*

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					Think Time	Visits						Average Service Time [sec.]							Population
Last digitis of "Codice Persona"					Z [sec.]	v1	v2	v3	v4	v5	v6	S1	S2	S3	S4	S5	S5	S6	N
00	20	40	60	80	10	1	1	1	0.2	0.2	0.4	1	0.25	10	6	5	20	10	30
01	21	41	61	81	20	2	1	0.5	1.25	0.2	0.2	0.2	0.25	6	3	10	10	10	25
02	22	42	62	82	5	3	0.5	0.5	1	1.5	0.4	1	2	15	6	2	5	20	30
03	23	43	63	83	20	3	3	1	1	1.5	1.5	1.5	0.2	15	10	10	10	25	40
04	24	44	64	84	10	1	10	3	0.2	0.2	1.5	1.5	0.4	6	15	2	20	25	30
05	25	45	65	85	1	2	10	0.5	0.1	1.25	0.2	1.5	2	10	10	2	5	20	30
06	26	46	66	86	10	3	4	2	1.5	1	0.4	0.25	0.25	15	6	2	20	25	25
07	27	47	67	87	10	2	2	10	1.5	0.2	1	0.2	1	12	6	2	5	25	30
08	28	48	68	88	10	3	1	1	1.5	1	0.4	0.25	0.2	15	10	5	25	2	25
09	29	49	69	89	20	0.5	4	0.5	0.1	0.4	0.4	2	0.25	6	15	5	5	5	25
10	30	50	70	90	20	0.5	0.5	4	0.4	0.2	1.25	2	0.25	3	15	10	5	25	30
11	31	51	71	91	20	10	1	4	0.4	0.2	1	1	0.25	15	6	10	2	5	25
12	32	52	72	92	1	0.5	3	10	1	0.2	1.25	0.4	0.4	10	3	10	20	10	30
13	33	53	73	93	1	3	3	1	0.2	1	1	0.25	0.4	3	10	5	2	5	25
14	34	54	74	94	10	0.5	1	4	1	1.5	1	0.2	1	6	10	10	10	10	30
15	35	55	75	95	10	3	1	10	0.4	1	0.1	1	0.25	12	12	10	25	10	30
16	36	56	76	96	10	4	3	10	1	1.5	0.2	0.4	1	6	12	10	25	2	25
17	37	57	77	97	10	2	2	2	1	1.5	1	0.25	0.2	6	15	5	10	25	40
18	38	58	78	98	10	0.5	0.5	4	0.4	1.25	0.1	2	1	3	3	10	20	20	30
19	39	59	79	99	1	2	10	1	0.1	0.1	1.25	1	1	15	10	1	2	20	40
Friday class					10	10	4	1	0.2	0.4	1.25	1.5	2	10	10	10	20	20	25
Monday					1	0.5	2	10	1	1	0.1	1	0.4	15	12	10	10	5	40