

## HOMework No.2

Consider 6 power systems which are consisting of 6 generators (thermal power plants). With the application of Excel you need to determine the output power of the generators in that way that the cumulative costs of the system are to be reduced to a minimum. Calculate the average production cost of the electricity expressed in €/MWh.

Three cases are considered for different values of the cumulative system load, these values are give in Table 1.

The data for the generators (their minimal and maximal power output and their cost curve coefficients) are given in Table 2 and Table 7.

**Table 1. Consumer load and information about which table of generators to use**

No	Surname and Name	Generators	$P_{P1}$ (MW)	$P_{P2}$ (MW)	$P_{P3}$ (MW)
12	Nikolov Filip	Table 5	850	940	1180

**Table 2. Characteristics of the generators - 1**

Бр.	$P_{\min}$ (MW)	$P_{\max}$ (MW)	$a$ (€/h)	$b$ (€/MWh)	$c$ (€/MW <sup>2</sup> h)
1	47	179	196	26	0.21
2	89	226	260	37	0.07
3	105	186	202	36	0.15
4	57	199	288	37	0.19
5	84	185	190	38	0.15
6	33	177	294	34	0.08

**Table 3. Characteristics of the generators - 2**

Бр.	$P_{\min}$ (MW)	$P_{\max}$ (MW)	$a$ (€/h)	$b$ (€/MWh)	$c$ (€/MW <sup>2</sup> h)
1	118	199	276	30	0.1
2	113	154	299	25	0.21
3	40	146	225	31	0.14
4	129	153	297	35	0.18
5	123	173	196	27	0.18
6	32	218	168	24	0.13

**Table 4. Characteristics of the generators - 3**

Бр.	$P_{\min}$ (MW)	$P_{\max}$ (MW)	$a$ (€/h)	$b$ (€/MWh)	$c$ (€/MW <sup>2</sup> h)
1	92	181	236	32	0.09
2	83	193	292	25	0.19
3	111	151	194	33	0.15
4	31	154	159	31	0.1
5	76	204	260	24	0.19
6	98	226	193	38	0.2

**Table 5. Characteristics of the generators - 4**

Бр.	$P_{\min}$ (MW)	$P_{\max}$ (MW)	$a$ (€/h)	$b$ (€/MWh)	$c$ (€/MW <sup>2</sup> h)
1	126	222	255	28	0.16
2	94	167	167	31	0.12
3	83	238	288	38	0.14
4	124	213	157	24	0.09
5	88	225	166	35	0.13
6	58	169	276	26	0.16

**Table 6. Characteristics of the generators - 5**

Бр.	$P_{\min}$ (MW)	$P_{\max}$ (MW)	$a$ (€/h)	$b$ (€/MWh)	$c$ (€/MW <sup>2</sup> h)
1	47	162	286	36	0.14
2	90	199	247	32	0.17
3	44	193	233	35	0.1
4	122	179	226	25	0.07
5	38	232	234	24	0.07
6	38	164	259	28	0.16

**Table 7. Characteristics of the generators - 6**

Бр.	$P_{\min}$ (MW)	$P_{\max}$ (MW)	$a$ (€/h)	$b$ (€/MWh)	$c$ (€/MW <sup>2</sup> h)
1	51	192	185	26	0.22
2	43	174	289	30	0.06
3	43	234	259	37	0.1
4	128	170	180	26	0.22
5	55	153	267	29	0.08
6	76	146	190	34	0.22