

Trh	CP	r_i	riziko	korelace _{A,B}
I	A	0.22	0.3	0.15
	B	0.31	0.32	
II	A	0.26	0.29	-0.06
	B	0.34	0.33	
III	A	0.18	0.2	0.09
	B	0.41	0.38	

I	A	0.22	0.3	0.15
	B	0.31	0.32	

CM

0.09	0.0144
0.0144	0.1024

Matice soustavy

0.18	0.0288	1
0.0288	0.2048	1
1	1	0

VPS

0
0
1

Inverzní Matice

3.056235	-3.056235	0.537897311	w1
-3.056235	3.056235	0.462102689	w2
0.537897	0.462103	-0.110130073	lambda1

wi

0.537897
0.462103
-0.11013

rp

0.261589

ZK

1.00	0.00	0.00
0.00	1.00	0.00
0.00	0.00	1.00

zk

1

II	A	0.26	0.29	-0.06
	B	0.34	0.33	

CM

0.0841	-0.005742
-0.005742	0.1089

Matice soustavy

0.1682	-0.011484	1
-0.011484	0.2178	1
1	1	0

VPS

0
0
1

Inverzní Matice

2.445179	-2.445179	0.560640441	w1
-2.445179	2.445179	0.439359559	w2
0.56064	0.43936	-0.089254117	lambda1

wi

0.56064
0.43936
-0.08925

rp

0.295149

ZK			zk	1
	1.00	0.00	0.00	
	0.00	1.00	0.00	
	0.00	0.00	1.00	

III	A	0.18	0.2	0.09
	B	0.41	0.38	

CM

0.04	0.00684
0.00684	0.1444

Matice soustavy

0.08	0.01368	1
0.01368	0.2888	1
1	1	0

VPS

0
0
1

Inverzní Matice

2.928772	-2.928772	0.805763824	w1
-2.928772	2.928772	0.194236176	w2
0.805764	0.194236	-0.067118257	lambda1

wi

0.805764
0.194236
-0.06712

rp

0.224674

ZK			zk	1
	1.00	0.00	0.00	
	0.00	1.00	0.00	
	0.00	0.00	1.00	

Trh	rp	sigma_p	SR-rp/sigma_p	SR-sigma_p/rp
I	0.261589	0.234659406	1.114761376	0.897053
II	0.295149	0.211251174	1.397146151	0.715745
III	0.224674	0.183191507	1.226445067	0.815365

nejlepší varianta!

$$w^2 \cdot \sigma^2 + w^2 \cdot \sigma^2 + 2 \cdot w \cdot w \cdot \sigma^2)^{0,5}$$

sigma_p
0.234659

sigma_p
0.211251

sigma_p
0.183192

	Firma 1	Firma 2	Firma 3		Kovariance	
μ	0.8	0.3	0.6		$\sigma_{1,2}$	-0.1
σ	1.2	0.8	1.1		$\sigma_{1,3}$	-0.5
					$\sigma_{2,3}$	0.3

vynos_i
0.8
0.3
0.6

CM

1.44	-0.1	-0.5
-0.1	0.64	0.3
-0.5	0.3	1.21

Matice soustavy

2.88	-0.2	-1	1
-0.2	1.28	0.6	1
-1	0.6	2.42	1
1	1	1	0

VPS

0
0
0
1

Inverzni M

0.219576	-0.23012	0.01054	0.332139
-0.23012	0.641161	-0.41105	0.379918
0.01054	-0.41105	0.400506	0.287943
0.332139	0.379918	0.287943	-0.59263

	wi
w1	0.332139
w2	0.379918
w3	0.287943
lambda1	-0.59263

zk 1

Matice soustavy (rp=15%)

2.88	-0.2	-1	1	0.8
-0.2	1.28	0.6	1	0.3
-1	0.6	2.42	1	0.6
1	1	1	0	0
0.8	0.3	0.6	0	0

VPS

0
0
0
1
0.15

Inverzni M

0.084002	0.056001	-0.14	-0.33097	1.200299
0.056001	0.037334	-0.09334	1.779354	-2.53313
-0.14	-0.09334	0.23334	-0.44839	1.332836
-0.33097	1.779354	-0.44839	-3.83598	5.870823
1.200299	-2.53313	1.332836	5.870823	-10.6268

	wi
w1	-0.15092
w2	1.399384
w3	-0.24846
lambda1	-2.95536
lambda2	4.276797

zk 1

rp	sigma_p
0.552452	0.54435

(jen zk)

rp	sigma_p
0.15	1.075602

Emise	CP ₁	CP ₂	CP ₃	CP ₄	CP ₅	CP ₆	CP ₇	r _i (v %)
CP ₁	80.5	82.7	85.3	85.1	123.9	22	3.5	1.9
CP ₂	82.7	184.7	131.5	69.4	49.5	58	-9.9	6.1
CP ₃	85.3	131.5	374.2	384.5	366.5	103.8	343.5	2.9
CP ₄	85.1	69.4	384.5	684.8	599.1	51.6	502.7	4
CP ₅	123.9	49.5	366.5	599.1	871.4	-21.2	520.4	5.7
CP ₆	22	58	103.8	51.6	-21.2	89.7	74.4	3.4
CP ₇	3.5	-9.9	343.5	502.7	520.4	74.4	574.6	4.9

Matice soustavy

161	165.4	170.6	170.2	247.8	44	7	1
165.4	369.4	263	138.8	99	116	-19.8	1
170.6	263	748.4	769	733	207.6	687	1
170.2	138.8	769	1369.6	1198.2	103.2	1005.4	1
247.8	99	733	1198.2	1742.8	-42.4	1040.8	1
44	116	207.6	103.2	-42.4	179.4	148.8	1
7	-19.8	687	1005.4	1040.8	148.8	1149.2	1
1	1	1	1	1	1	1	0

Inverzni M

0.077542	-0.00619	0.008788	-0.00971	-0.03769	-0.07775	0.045002	2.1372
-0.00619	0.007803	-0.00362	0.000167	0.001056	-0.00048	0.001254	0.044435
0.008788	-0.00362	0.007544	-0.00229	-0.00426	-0.00879	0.002623	-0.29067
-0.00971	0.000167	-0.00229	0.004278	0.004072	0.01066	-0.00718	-0.23027
-0.03769	0.001056	-0.00426	0.004072	0.02058	0.040175	-0.02394	-0.77333
-0.07775	-0.00048	-0.00879	0.01066	0.040175	0.086382	-0.0502	-1.1224
0.045002	0.001254	0.002623	-0.00718	-0.02394	-0.0502	0.032436	1.235036
2.1372	0.044435	-0.29067	-0.23027	-0.77333	-1.1224	1.235036	-30.2875

Matice soustavy (rp=5%)

161	165.4	170.6	170.2	247.8	44	7	1
165.4	369.4	263	138.8	99	116	-19.8	1
170.6	263	748.4	769	733	207.6	687	1
170.2	138.8	769	1369.6	1198.2	103.2	1005.4	1
247.8	99	733	1198.2	1742.8	-42.4	1040.8	1
44	116	207.6	103.2	-42.4	179.4	148.8	1
7	-19.8	687	1005.4	1040.8	148.8	1149.2	1
1	1	1	1	1	1	1	0
1.9	6.1	2.9	4	5.7	3.4	4.9	0

Inverzni M

0.016039	0.007661	-0.00407	-0.00315	-0.00914	-0.02351	0.016171	2.286871
0.007661	0.004685	-0.00072	-0.00131	-0.00537	-0.01269	0.007746	0.010736
-0.00407	-0.00072	0.004856	-0.00092	0.001708	0.002544	-0.0034	-0.25938
-0.00315	-0.00131	-0.00092	0.003579	0.001028	0.004877	-0.00411	-0.24623

-0.00914	-0.00537	0.001708	0.001028	0.00733	0.015	-0.01055	-0.8428
-0.02351	-0.01269	0.002544	0.004877	0.015	0.038551	-0.02477	-1.2544
0.016171	0.007746	-0.0034	-0.00411	-0.01055	-0.02477	0.01892	1.305199
2.286871	0.010736	-0.25938	-0.24623	-0.8428	-1.2544	1.305199	-30.6517
-0.37867	0.085259	-0.07916	0.040381	0.175762	0.333946	-0.17751	0.921531

VPS

0
0
0
0
0
0
0
1

sigma_p^2

	wi
w1	2.1372
w2	0.044435
w3	-0.29067
w4	-0.23027
w5	-0.77333
w6	-1.1224
w7	1.235036
lambda1	-30.2875

rp	sigma_p
0.39525	3.891496

2.1372
0.044435
-0.29067
-0.23027
-0.77333
-1.1224
1.235036

zk 1

15.14374206

VPS

1.9	0
6.1	0
2.9	0
4	0
5.7	0
3.4	0
4.9	0
0	1
0	5

(jen zk)

-0.37867
0.085259
-0.07916
0.040381

	wi
w1	0.3935
w2	0.43703
w3	-0.65518
w4	-0.04433

rp	sigma_p
5	6.313646

0.393500391
0.437029695
-0.65517948
-0.04432817

0.175762	w5	0.036015	0.036014728
0.333946	w6	0.415334	0.415333712
-0.17751	w7	0.417629	0.417629131
0.921531	lambda1	-26.0441	
-2.33151	lambda2	-10.736	
	zk	1	

2.137199771 0.044435 -0.290669 -0.230273 -0.773326 -1.122403 1.235036

367.6936402 7.853678 -52.98983 -41.88104 -204.776 -52.77361 9.238319
7.85367765 0.36468 -1.698426 -0.710108 -1.700945 -2.892673 -0.543297
-52.98983461 -1.698426 31.61554 25.73579 82.38249 33.86451 -123.3119
-41.8810356 -0.710108 25.73579 36.31192 106.6853 13.33649 -142.9655
-204.7759573 -1.700945 82.38249 106.6853 521.1259 -18.40125 -497.0266
-52.77360681 -2.892673 33.86451 13.33649 -18.40125 113.0031 -103.134
9.238318563 -0.543297 -123.3119 -142.9655 -497.0266 -103.134 876.446

sigma_p^2

0.3935 0.43703 -0.655179 -0.044328 0.036015 0.415334 0.417629

12.46483 14.22203 -21.99148 -1.484412 1.755887 3.595548 0.57518
14.22203 35.27677 -37.65277 -1.344467 0.779106 10.52776 -1.806912
-21.99148 -37.65277 160.6291 11.167 -8.647975 -28.24586 -93.98917
-1.484412 -1.344467 11.167 1.345623 -0.956443 -0.950007 -9.306353

1.755887	0.779106	-8.647975	-0.956443	1.130259	-0.317112	7.827232
3.595548	10.52776	-28.24586	-0.950007	-0.317112	15.47344	12.90509
0.57518	-1.806912	-93.98917	-9.306353	7.827232	12.90509	100.2183

39.86212538

Riziková portfolia	A	B	C	D
\bar{r}_p	6.20%	4%	7.50%	8.40%
σ_p	14.50%	9.70%	17%	20%

rf

0.035

	1.	2.	3.	4.	5.
r_f	0.2	0.4	0.5	0.6	0.8
Portfolio	0.8	0.6	0.5	0.4	0.2

	Portfolio	1.	2.	3.	4.	5.
A	rp	0.0566	0.0512	0.0485	0.0458	0.0404
	sigma_p	0.116	0.087	0.0725	0.058	0.029
B	rp	0.039	0.038	0.0375	0.037	0.036
	sigma_p	0.0776	0.0582	0.0485	0.0388	0.0194
C	rp	0.067	0.059	0.055	0.051	0.043
	sigma_p	0.136	0.102	0.085	0.068	0.034
D	rp	0.0742	0.0644	0.0595	0.0546	0.0448
	sigma_p	0.16	0.12	0.1	0.08	0.04