

Sestrojení grafu závislosti ceny call warrantu na veličinách ovlivňujících jeho cenu

BS vzorec

$$C = S_0 N(d_1) - Ke^{-rt} N(d_2)$$

$$d_1 = (\ln(S_0/K) + (r + \sigma^2/2)T) / (\sigma \sqrt{T})$$

$$d_2 = (\ln(S_0/K) + (r - \sigma^2/2)T) / (\sigma \sqrt{T})$$

počáteční hodnoty

S_0 100

K 100

r 8% p.a.

T 1 rok

σ 50%

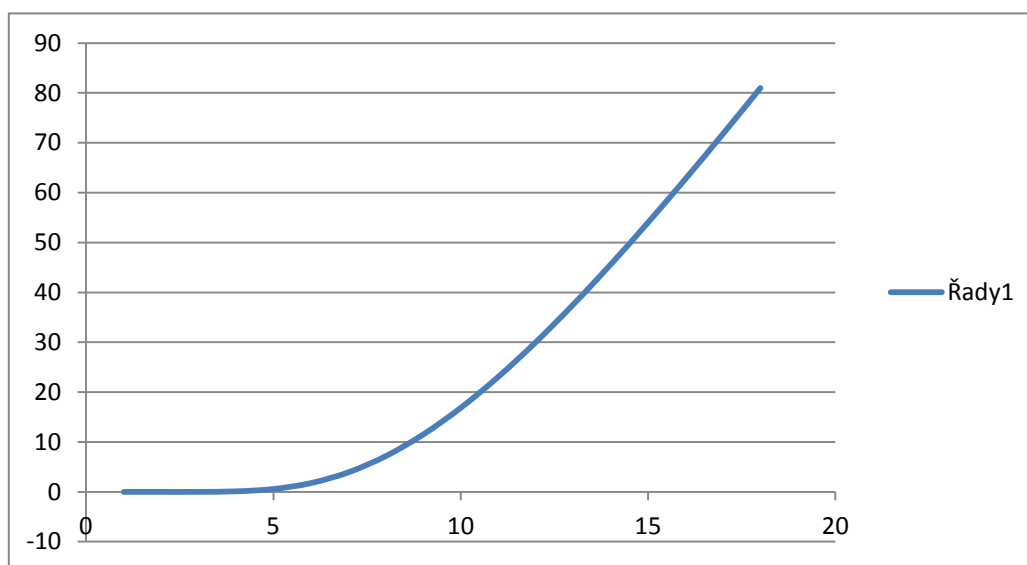
Data pro závislost na S0:

S0	0.001	10	20	30	40	50	60	70
K	100	100	100	100	100	100	100	100
r	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
T	1	1	1	1	1	1	1	1
σ	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5

Výpočet:

d1	-22.6159	-4.19517	-2.80888	-1.99795	-1.42258	-0.97629	-0.61165	-0.30335
d2	-23.1159	-4.69517	-3.30888	-2.49795	-1.92258	-1.47629	-1.11165	-0.80335
N(d1)	1.5E-113	1.36E-05	0.002486	0.022861	0.077429	0.164459	0.270384	0.380812
N(d2)	1.6E-118	1.33E-06	0.000468	0.006246	0.027266	0.069932	0.133144	0.210886
C	3.3E-118	1.34E-05	0.00648	0.109281	0.580152	1.767387	3.932309	7.189557

Graf:



80	90	100	110	120	130	140	150	160
100	100	100	100	100	100	100	100	100
0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
1	1	1	1	1	1	1	1	1
0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5

-0.03629	0.199279	0.41	0.60062	0.774643	0.934729	1.082944	1.22093	1.350007
-0.53629	-0.30072	-0.09	0.10062	0.274643	0.434729	0.582944	0.72093	0.850007
0.485527	0.578978	0.659097	0.725954	0.780725	0.825036	0.860583	0.888944	0.911493
0.29588	0.381814	0.464144	0.540074	0.608205	0.66812	0.720035	0.764524	0.802339
11.52896	16.86216	23.06385	29.99977	37.54259	45.57939	54.01411	62.76713	71.77364

170
100
0.08
1
0.5

1.471257
0.971257
0.929389
0.83429
80.9815

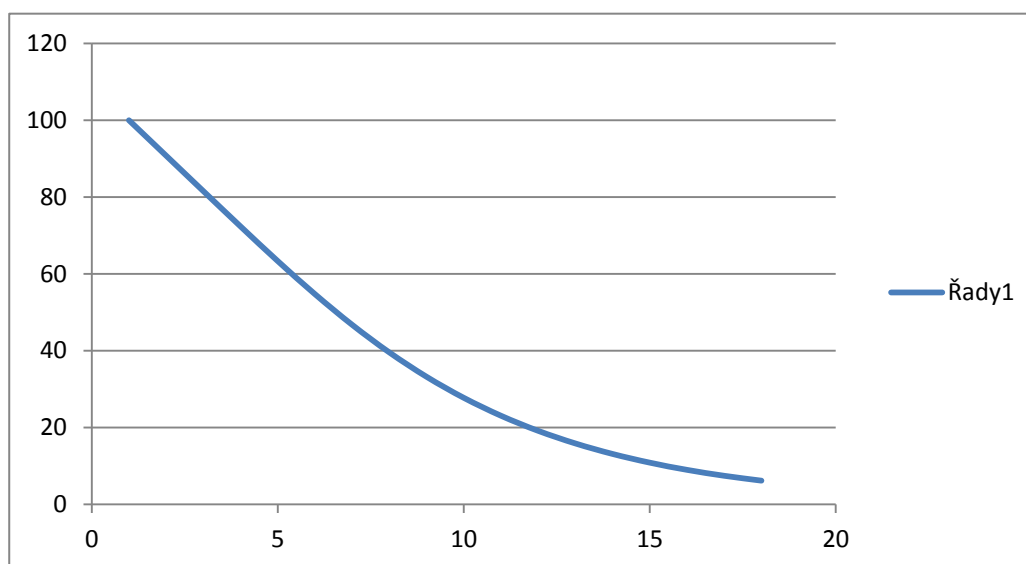
Data pro závislost na K:

S0	100	100	100	100	100	100	100	100
K	0.001	10	20	30	40	50	60	70
r	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
T	1	1	1	1	1	1	1	1
σ	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5

Výpočet:

d1	23.43585	5.01517	3.628876	2.817946	2.242581	1.796294	1.431651	1.12335
d2	22.93585	4.51517	3.128876	2.317946	1.742581	1.296294	0.931651	0.62335
N(d1)	1	1	0.999858	0.997583	0.987538	0.963776	0.923878	0.869356
N(d2)	1	0.999997	0.999123	0.989774	0.959297	0.902563	0.824242	0.733473
C	99.99908	90.76884	81.53964	72.34805	63.33211	54.71908	46.73556	39.53991

Graf:



100	100	100	100	100	100	100	100	100
80	90	100	110	120	130	140	150	160
0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
1	1	1	1	1	1	1	1	1
0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5

0.856287	0.620721	0.41	0.21938	0.045357	-0.11473	-0.26294	-0.40093	-0.53001
0.356287	0.120721	-0.09	-0.28062	-0.45464	-0.61473	-0.76294	-0.90093	-1.03001
0.804081	0.732608	0.659097	0.586823	0.518089	0.45433	0.396297	0.344236	0.298053
0.639187	0.548044	0.464144	0.389501	0.324683	0.269367	0.222748	0.183813	0.151503
33.20452	27.72909	23.06385	19.13128	15.84243	13.10759	10.84251	8.971497	7.428517

100
170
0.08
1
0.5

-0.65126
-1.15126
0.25744
0.124813
6.157113

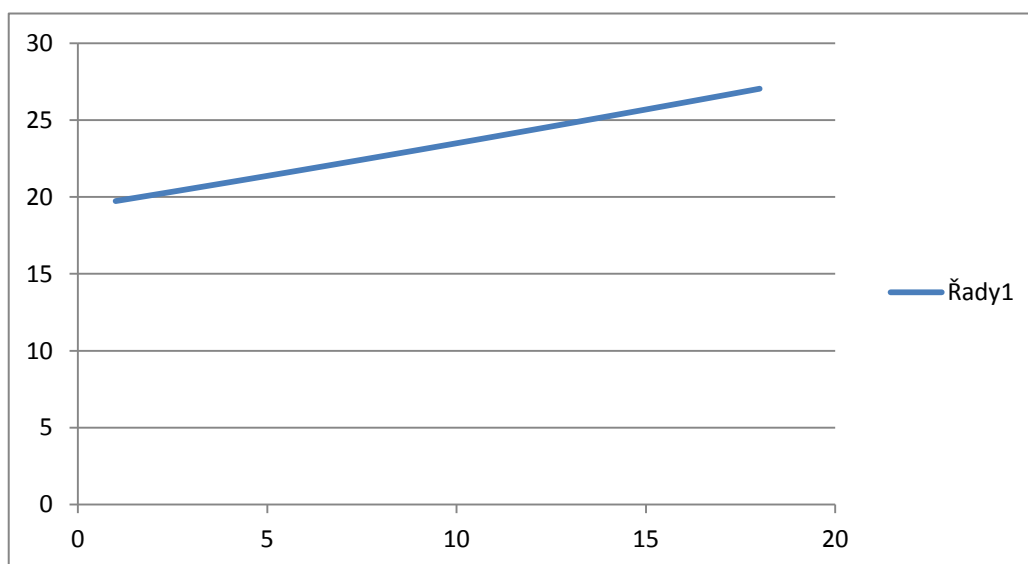
Data pro závislost na r:

S0	100	100	100	100	100	100	100	100
K	100	100	100	100	100	100	100	100
r	0	0.01	0.02	0.03	0.04	0.05	0.06	0.07
T	1	1	1	1	1	1	1	1
σ	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5

Výpočet:

d1	0.25	0.27	0.29	0.31	0.33	0.35	0.37	0.39
d2	-0.25	-0.23	-0.21	-0.19	-0.17	-0.15	-0.13	-0.11
N(d1)	0.598706	0.60642	0.614092	0.62172	0.6293	0.636831	0.644309	0.651732
N(d2)	0.401294	0.409046	0.416834	0.424655	0.432505	0.440382	0.448283	0.456205
C	19.74127	20.14441	20.55119	20.96154	21.37537	21.7926	22.21315	22.63693

Graf:



100	100	100	100	100	100	100	100	100
100	100	100	100	100	100	100	100	100
0.08	0.09	0.1	0.11	0.12	0.13	0.14	0.15	0.16
1	1	1	1	1	1	1	1	1
0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5

0.41	0.43	0.45	0.47	0.49	0.51	0.53	0.55	0.57
-0.09	-0.07	-0.05	-0.03	-0.01	0.01	0.03	0.05	0.07
0.659097	0.666402	0.673645	0.680822	0.687933	0.694974	0.701944	0.70884	0.715661
0.464144	0.472097	0.480061	0.488034	0.496011	0.503989	0.511966	0.519939	0.527903
23.06385	23.49382	23.92674	24.36254	24.80111	25.24235	25.68618	26.13248	26.58117

100

100

0.17

1

0.5

0.59

0.09

0.722405

0.535856

27.03215

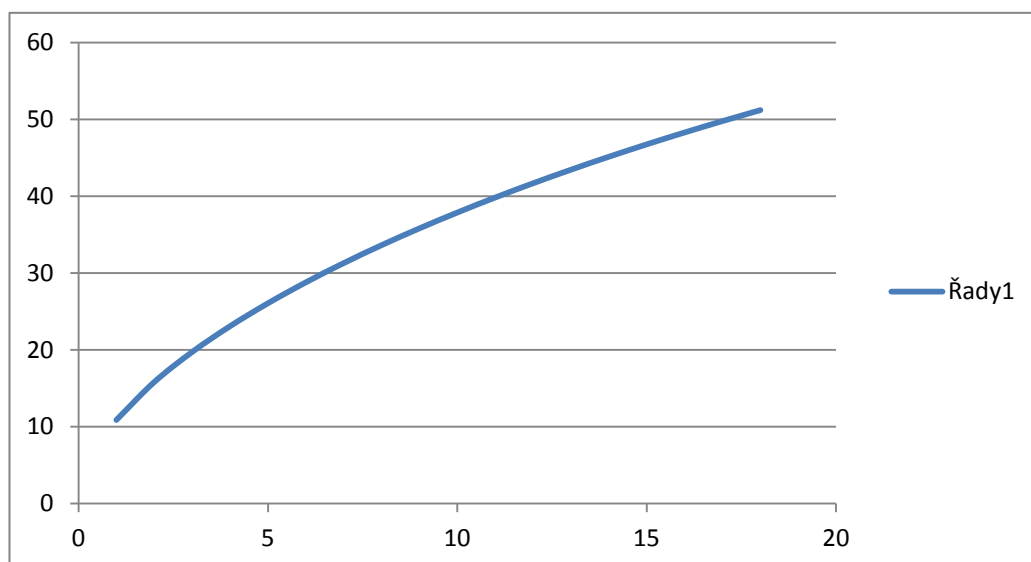
Data pro závislost na T:

S0	100	100	100	100	100	100	100	100
K	100	100	100	100	100	100	100	100
r	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
T	0.25	0.5	0.75	1	1.25	1.5	1.75	2
σ	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5

Výpočet:

d1	0.205	0.289914	0.35507	0.41	0.458394	0.502145	0.542379	0.579828
d2	-0.045	-0.06364	-0.07794	-0.09	-0.10062	-0.11023	-0.11906	-0.12728
N(d1)	0.581214	0.614059	0.638732	0.659097	0.676665	0.692217	0.706221	0.718985
N(d2)	0.482054	0.474629	0.468937	0.464144	0.459925	0.456115	0.452614	0.44936
C	10.87056	15.80408	19.71034	23.06385	26.05081	28.768	31.27372	33.60655

Graf:



100	100	100	100	100	100	100	100	100
100	100	100	100	100	100	100	100	100
0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
2.25	2.5	2.75	3	3.25	3.5	3.75	4	4.25
0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5

0.615	0.648267	0.679908	0.710141	0.739138	0.76704	0.793962	0.82	0.845237
-0.135	-0.1423	-0.14925	-0.15588	-0.16225	-0.16837	-0.17428	-0.18	-0.18554
0.730723	0.741594	0.751719	0.761192	0.770088	0.778471	0.786391	0.793892	0.801011
0.446306	0.443421	0.440679	0.438062	0.435555	0.433144	0.430821	0.428576	0.426403
35.79366	37.85518	39.80655	41.65998	43.42534	45.11076	46.7231	48.26817	49.75097

100
100
0.08
4.5
0.5

0.869741
-0.19092
0.807779
0.424295
51.17588

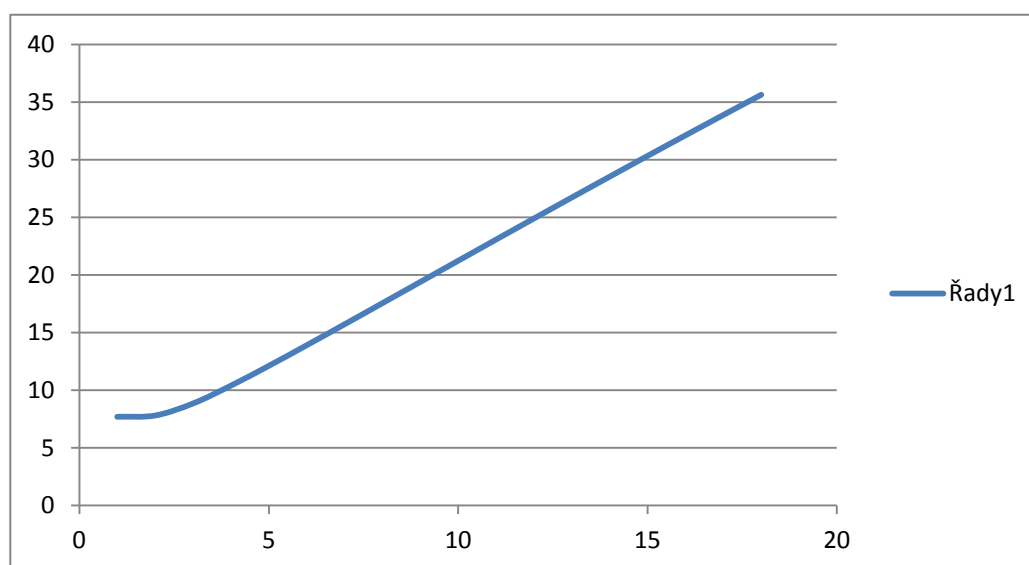
Data pro závislost na σ :

S0	100	100	100	100	100	100	100	100
K	100	100	100	100	100	100	100	100
r	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
T	1	1	1	1	1	1	1	1
σ	0.001	0.05	0.1	0.15	0.2	0.25	0.3	0.35

Výpočet:

d1	80.0005	1.625	0.85	0.608333	0.5	0.445	0.416667	0.403571
d2	79.9995	1.575	0.75	0.458333	0.3	0.195	0.116667	0.053571
N(d1)	1	0.947919	0.802337	0.728517	0.691462	0.67184	0.661539	0.656736
N(d2)	1	0.942372	0.773373	0.676644	0.617911	0.577304	0.546438	0.521362
C	7.688365	7.799993	8.842452	10.38961	12.10583	13.89218	15.71131	17.54586

Graf:



100	100	100	100	100	100	100	100	100
100	100	100	100	100	100	100	100	100
0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
1	1	1	1	1	1	1	1	1
0.4	0.45	0.5	0.55	0.6	0.65	0.7	0.75	0.8

0.4	0.402778	0.41	0.420455	0.433333	0.448077	0.464286	0.481667	0.5
-3.5E-17	-0.04722	-0.09	-0.12955	-0.16667	-0.20192	-0.23571	-0.26833	-0.3
0.655422	0.656444	0.659097	0.662923	0.667614	0.672951	0.678778	0.684979	0.691462
0.5	0.481168	0.464144	0.448463	0.433816	0.419988	0.406827	0.394221	0.382089
19.38636	21.227	23.06385	24.89397	26.71509	28.5253	30.32296	32.10664	33.87502

100
100
0.08
1
0.85

0.519118
-0.33088
0.698161
0.370367
35.62691