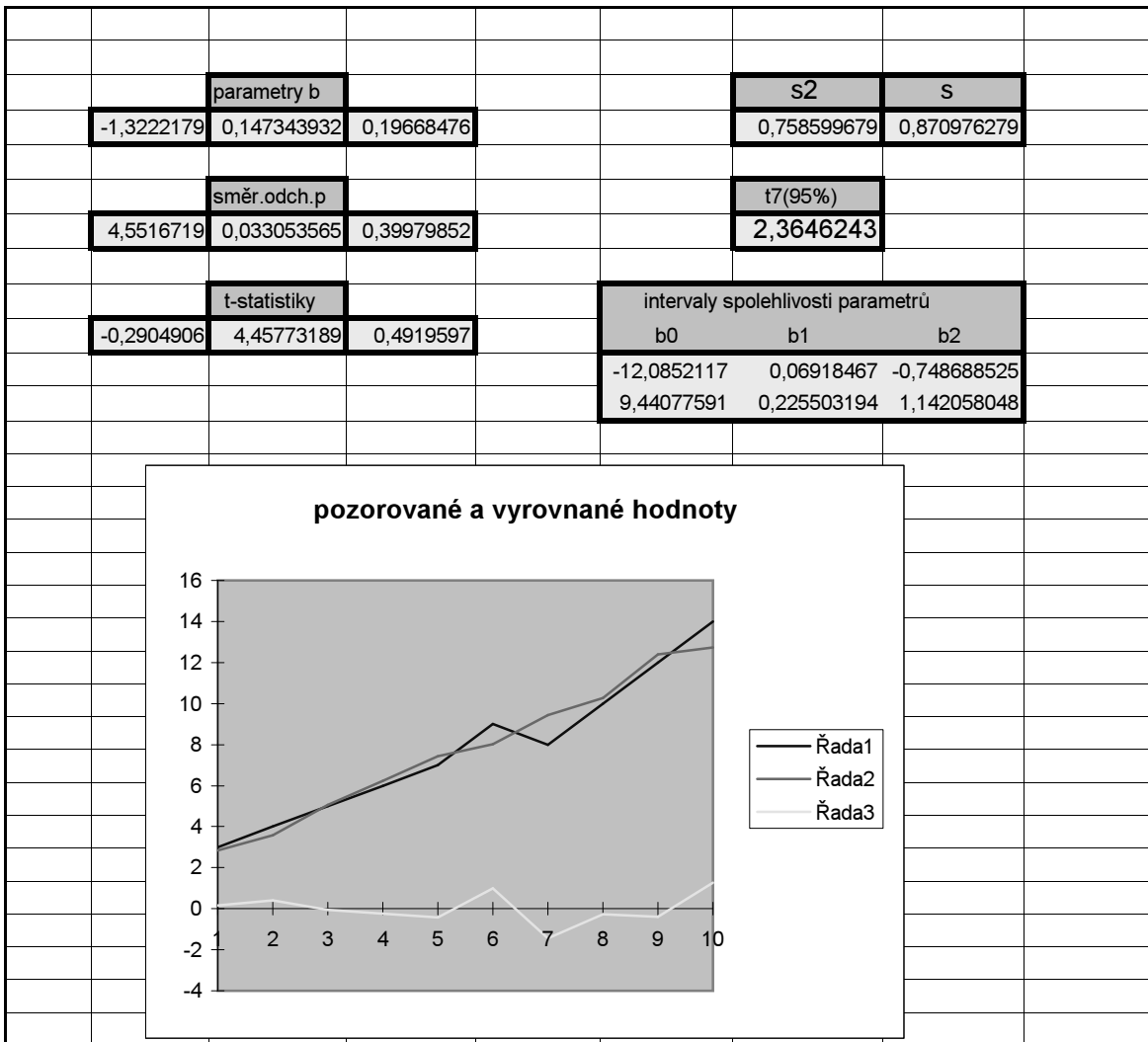


Umělopříklad

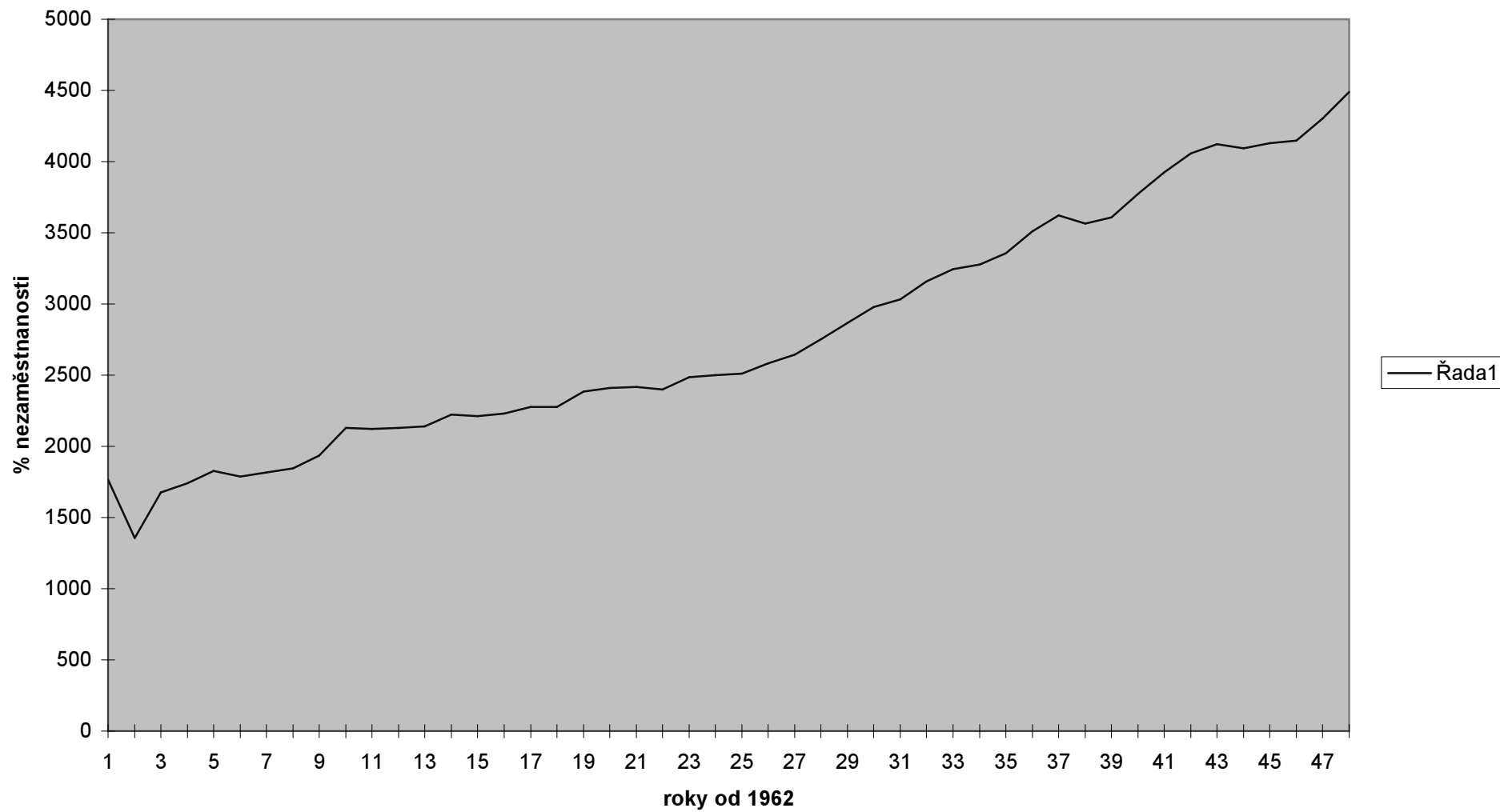
Jednoduchý příklad na lineární regresi se dvěma vysvětlujícími proměnnými								
závisle proměnná	vektor konstant	1.nezávisle proměnná	2.nezávisle proměnná					
y	1	x1	x2	x1*x1	x2*x2	x1*x2		
3	1	15	10	225	100	150		
4	1	20	10	400	100	200		
5	1	30	10	900	100	300		
6	1	42	7	1764	49	294		
7	1	50	7	2500	49	350		
9	1	54	7	2916	49	378		
8	1	65	6	4225	36	390		
10	1	72	5	5184	25	360		
12	1	85	6	7225	36	510		
14	1	90	4	8100	16	360		
78	10	523	72	33439	560	3292		
matice X' X				det X' X				
10	523	72						
523	33439	3292			288848			
72	3292	560						
adj(X' X)				(X' X) <sup>-1</sup>				
7888576	-55856	-685892		27,31047	-0,1933751	-2,374578		
-55856	416	4736		-0,19338	0,0014402	0,0163962		
-685892	4736	60861		-2,37458	0,0163962	0,2107025		
vektor X' y				vysvětlený rozptyl				
78	4883	500			714,6898022			
parametry b				nevysvětlený rozptyl				
-1,3222	0,147344	0,196685			5,310197751			
pozorované hodnoty	vyrovnané hodnoty	rezidua hodnoty	čtverce reziduí	odchylky yv od prum.	čtv. posun. reziduí	čtv.pozor. hodnot	čtv.vyrovn. hodnot	
y	yv	u	u <sup>2</sup>	yv-yvprum	[u(t) - u(t-1)] <sup>2</sup>	y <sup>2</sup>	(yv) <sup>2</sup>	
3	2,854788678	0,14521132	0,02108633	-4,94521132	0,069316538	9	8,149818395	
4	3,591508337	0,40849166	0,16686544	-4,20849166	0,224144787	16	12,89893213	
5	5,064947654	-0,06494765	0,0042182	-2,73505235	0,031709956	25	25,65369474	
6	6,243020551	-0,24302055	0,05905899	-1,55697945	0,031952082	36	38,9753056	
7	7,421772005	-0,421772	0,17789162	-0,378228	1,98986084	49	55,08269969	
9	8,011147732	0,98885227	0,97782881	0,211147732	5,876253478	81	64,17848798	
8	9,435246219	-1,43524622	2,05993171	1,635246219	1,357871044	64	89,02387122	
10	10,26996898	-0,26996898	0,07288325	2,46996898	0,01257894	100	105,4722629	
12	12,38212485	-0,38212485	0,1460194	4,582124855	2,744488773	144	153,3170159	
14	12,72547499	1,27452501	1,624414	4,92547499	0	196	161,9377137	
součet	78	78	-1,4779E-12	5,31019775	0	12,33817644	720	714,6898022
průměr	7,8	7,8	0	0,53101978	0	1,233817644	72	71,46898022
koeficient determinace				Durbin/Watsonův koeficient				
	0,992624725				2,323487188			
	0,992624725			vN poměr	2,091138469			

## Umělýpříklad



Graf1

nezaměstnanost muži 16-17 let



Spotřeba orig.

Závislost spotřeby na důchodu USA 1929-1984 - data převzata Maddala : Intr. to Ec. str. 57-59				
údaje za rok	spotřeba mld.USD	ženy	důchod mld.USD	
	y1	"1"	x2	
1929	1765	1	1883	
1933	1356	1	1349	
1939	1678	1	1754	
1940	1740	1	1847	
1941	1826	1	2083	matice X' X
1942	1788	1	2354	48 148275
1943	1815	1	2429	148275 497987425
1944	1844	1	2483	
1945	1936	1	2416	
1946	2129	1	2353	adj(X' X)
1947	2122	1	2212	497987425 -148275
1948	2129	1	2290	-148275 48
1949	2140	1	2257	
1950	2224	1	2392	
1951	2214	1	2415	vektor X' y
1952	2230	1	2441	133842
1953	2277	1	2501	449836268
1954	2278	1	2483	det X' X
1955	2384	1	2582	1917920775
1956	2410	1	2653	
1957	2416	1	2660	(X' X)-1
1958	2400	1	2645	0,259649633 -7,731E-05
1959	2487	1	2709	-7,731E-05 2,50271E-08
1960	2501	1	2709	
1961	2511	1	2742	
1962	2583	1	2813	parametry b
1963	2644	1	2865	-24,94352 0,91074 0
1964	2751	1	3026	
1965	2868	1	3171	
1966	2979	1	3290	vysvětlený rozptyl
1967	3032	1	3389	21218320,86
1968	3160	1	3493	
1969	3245	1	3564	nevysvětlený rozptyl
1970	3277	1	3665	25,01619714
1971	3355	1	3752	
1972	3511	1	3860	
1973	3623	1	4080	
1974	3566	1	4009	
1975	3609	1	4051	
1976	3774	1	4158	
1977	3924	1	4280	
1978	4057	1	4441	
1979	4121	1	4512	
1980	4093	1	4487	
1981	4131	1	4561	
1982	4146	1	4555	
1983	4303	1	4670	

## Spotřeba orig.

1984	4490	1	4941				
	pozorované hodnoty	vyrovnané hodnoty	rezidua hodnoty	čtverce reziduí	čtverce yv od prům.	čtverce y od prům.	čtv. posun. reziduí
	y	yv	u	u <sup>2</sup>	yv-yvprum		[u(t) - u(t-1)] <sup>2</sup>
1929	1765	1689,97	75,0287944	5629,320	7362247,632	1047296,391	0,000
1933	1356	1203,64	152,36149	23214,024	6948567,227	2051698,141	5980,346
1939	1678	1572,49	105,513659	11133,132	7197744,975	1232932,641	2194,719
1940	1740	1657,18	82,8152682	6858,369	7320053,462	1099090,141	515,217
1941	1826	1872,12	-46,118282	2126,896	8034352,168	926165,641	16623,860
1942	1788	2118,93	-330,92757	109513,058	9730048,533	1000750,141	81116,331
1943	1815	2187,23	-372,23273	138557,202	9989441,194	947458,891	1706,116
1944	1844	2236,41	-392,41244	153987,520	10117408,714	891844,141	407,221
1945	1936	2175,39	-239,39317	57309,088	9167380,064	726543,141	23414,897
1946	2129	2118,02	10,9831638	120,630	7713905,412	434775,391	62688,306
1947	2122	1989,60	132,396853	17528,927	7054219,918	444055,641	14741,284
1948	2129	2060,64	68,359493	4673,020	7398484,358	434775,391	4100,783
1949	2140	2030,59	109,413761	11971,371	7176833,322	420390,141	1685,453
1950	2224	2153,54	70,4644838	4965,243	7387037,574	318519,141	1517,046
1951	2214	2174,48	39,51757	1561,638	7556217,171	329906,641	957,711
1952	2230	2198,16	31,83845	1013,687	7598493,752	311782,641	58,969
1953	2277	2252,81	24,1943269	585,365	7640694,794	261504,391	58,433
1954	2278	2236,41	41,5875638	1729,525	7544841,220	260482,641	302,525
1955	2384	2326,58	57,4247608	3297,603	7458089,209	163519,141	250,817
1956	2410	2391,24	18,7625485	352,033	7670753,132	143167,641	1494,767
1957	2416	2397,61	18,3874008	338,097	7672831,300	138663,141	0,141
1958	2400	2383,95	16,0484316	257,552	7685794,602	150835,141	5,471
1959	2487	2442,24	44,761367	2003,580	7527415,767	90826,891	824,433
1960	2501	2442,24	58,761367	3452,898	7450790,586	82584,391	196,000
1961	2511	2472,29	38,7070993	1498,240	7560673,564	76936,891	402,174
1962	2583	2536,96	46,044887	2120,132	7520374,449	42178,891	53,843
1963	2644	2584,31	59,686647	3562,496	7445740,128	20844,141	186,098
1964	2751	2730,94	20,0582502	402,333	7663577,627	1396,891	1570,410
1965	2868	2863,00	5,00161945	25,016	7747167,376	6340,141	226,702
1966	2979	2971,38	7,62410873	58,127	7732575,519	36337,891	6,877
1967	3032	3061,54	-29,538694	872,534	7940637,589	59353,141	1381,074
1968	3160	3156,26	3,74482572	14,024	7754165,208	138105,141	1107,793
1969	3245	3220,92	24,0826134	579,972	7641312,398	208506,391	413,626
1970	3277	3312,90	-35,90166	1288,929	7976538,654	238754,391	3598,113
1971	3355	3392,14	-37,135639	1379,056	7983510,370	321063,891	1,523
1972	3511	3490,50	20,5049397	420,453	7661104,671	522186,891	3322,436
1973	3623	3690,86	-67,856845	4604,551	8158060,351	696598,891	7807,805
1974	3566	3626,19	-60,194633	3623,394	8114348,952	604700,641	58,709
1975	3609	3664,45	-55,445519	3074,206	8087315,143	673425,391	22,554
1976	3774	3761,89	12,1057952	146,550	7707670,698	971456,641	4563,180
1977	3924	3873,00	50,9960783	2600,600	7493243,361	1289644,141	1512,454

## Spotřeba orig.

1978	4057	4019,63	37,3676814	1396,344	7568041,267	1609409,391	185,733
1979	4121	4084,29	36,7054692	1347,291	7571685,207	1775889,391	0,439
1980	4093	4061,53	31,4738538	990,603	7600503,930	1702046,391	27,370
1981	4131	4128,92	2,07943533	4,324	7763442,974	1802641,891	864,032
1982	4146	4123,46	22,5438476	508,225	7649821,963	1843145,641	418,792
1983	4303	4228,19	74,8092784	5596,428	7363438,925	2294088,891	2731,675
1984	4490	4475,00	14,9999893	225,000	7691608,950	2895527,641	3577,151
<b>součty</b>	133842	133842	0,000	598518,606	373800205,356	33740147,250	254881,408
	2788,3750	2788,3750	0	31500,979	0,000	0,000	13414,811
<b>koeficient determinace</b>				<b>Dále nedopracováno</b>			
		#DIV/0!					
		#DIV/0!					
		<b>parametry b</b>		<b>Durbin/Watsonův koeficient</b>			
	-24,94352	0,91074			0,00000		
				<b>vN poměr</b>	0,00000		
		<b>směr.odch.p</b>					
	#REF!	#REF!					
				<b>t17(95%)</b>	<b>s2</b>	<b>s</b>	
		<b>t-statistiky</b>		2,1098	35206,9768	187,6352	
	#REF!	#REF!					
					<b>t17(95%)</b>		
					2,109815559		
				<b>intervaly spolehlivosti parametrů</b>			
				<b>b0</b>	<b>b1</b>	<b>b2</b>	
				#REF!	#REF!		0
				#REF!	#REF!		0



Spotřeba orig.

čtv.pozor. hodnot	čtv.vyrovň. hodnot
y2	(yv)2
3115225,0	2856002,7
1838736,0	1448745,7
2815684,0	2472713,3
3027600,0	2746261,2
3334276,0	3504826,9
3196944,0	4489854,1
3294225,0	4783987,0
3400336,0	5001540,6
3748096,0	4732335,4
4532641,0	4485995,3
4502884,0	3958520,7
4532641,0	4246239,3
4579600,0	4123280,5
4946176,0	4637715,2
4901796,0	4728373,8
4972900,0	4831914,2
5184729,0	5075133,4
5189284,0	5001540,6
5683456,0	5412952,3
5808100,0	5718016,5
5837056,0	5748546,2
5760000,0	5683225,1
6185169,0	5964529,5
6255001,0	5964529,5
6305121,0	6112232,2
6671889,0	6436141,2
6990736,0	6678675,5
7568001,0	7458042,8
8225424,0	5001540,6
8874441,0	8829074,7
9193024,0	9373019,2
9985600,0	9961946,7
10530025,0	10374308,8
10738729,0	10975317,4
11256025,0	11506584,2
12327121,0	12183555,8
13126129,0	13622424,2
12716356,0	13149287,5
13024881,0	13428161,0
14243076,0	14151848,0
15397776,0	15000159,4



Spotřeba orig.

16459249,0	16157444,0
16982641,0	16681461,8
16752649,0	16495994,6
17065161,0	17047985,0
17189316,0	17002890,6
18515809,0	17877596,8
20160100,0	20025625,1
406941834,0	403148096,3
21417991,263	21218320,855