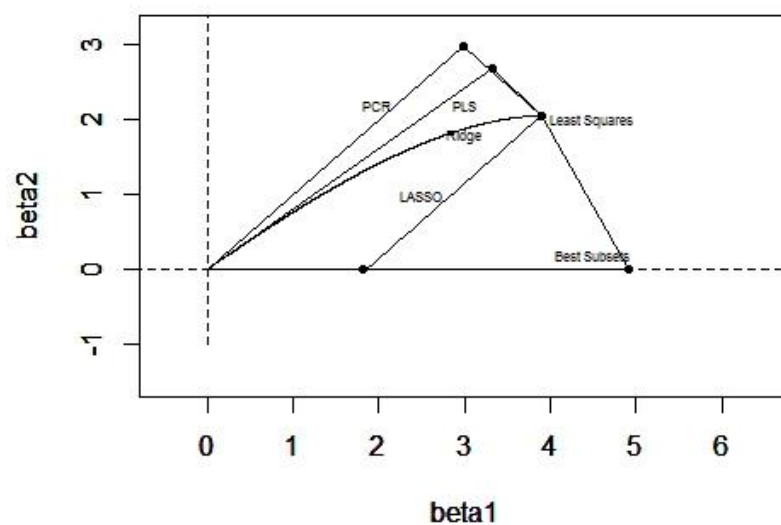# Homework 5

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Question 1 : Do Best Subset, LS, ridge, LASSO, PCR, PLSR with test1.csv and print

the picture of augment of coefficients.

	β_1	β_2
Best Subset (one coef)	4.911738	0.000000
Least Squares	3.905776	2.062960
Ridge(lambda=0.1)	3.901938	2.062747
Ridge(lambda=1)	3.867835	2.060646
Ridge(lambda=10)	3.564286	2.024941
Ridge(lambda=100)	2.087557	1.467379
Ridge(lambda=1000)	0.4275842	0.3386208
LASSO(one coef)	1.835776	0.000000
PCR	2.984368	2.984368
PLSR	3.326100	2.686711

Picture:

Question 2 : Do Best Subset, LS, ridge, LASSO, PCR, PLSR with test2.csv and print the picture of augment of coefficients.

	β_1	β_2
Best Subset (one coef)	3.122918	0.000000
Least Squares	4.246924	2.132441
Ridge(lambda=0.1)	4.239426	2.126341
Ridge(lambda=1)	4.173271	2.072683
Ridge(lambda=10)	3.619938	1.636641
Ridge(lambda=100)	1.653466	0.380794
Ridge(lambda=1000)	0.28149917	0.00380805
LASSO(one coef)	2.106924	0.000000
PCR	1.057241	-1.057241
PLSR	3.0150509	-0.1024396

Picture:
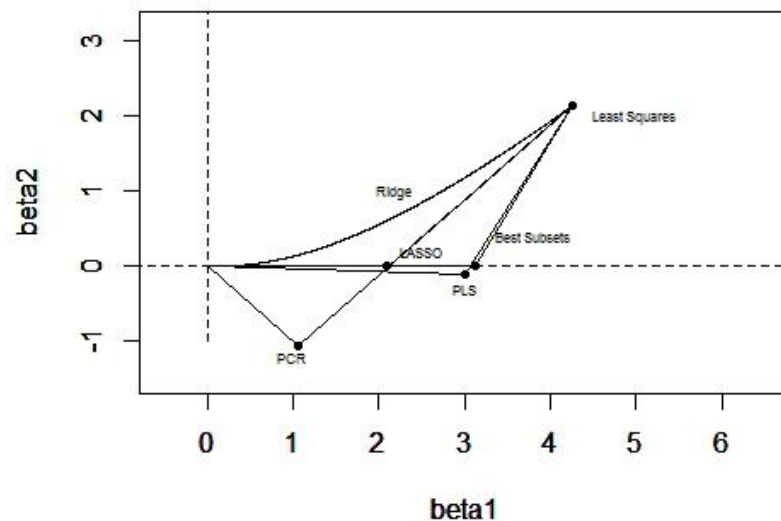
Question 3 : Do LS, Best Subset, Ridge, Lasso, LARS, PCR, PLSR with test3.csv and choose the parameter by 10-fold CV.

	LS	Best Subset	Ridge(0.1)(best)
β_1	2.883848102	2.88378182	2.882099544
β_2	1.427134534	1.42682870	1.426986173
β_3	0.053950165	0.05421208	0.054107539
β_4	0.026135558	0.02585522	0.026960115
β_5	2.021524935	2.02147231	2.019153045
β_6	-0.094350188	-0.09424550	-0.092872244
β_7	0.069138302	0.06704977	0.068856381
β_8	-0.003894534	0.00000000	-0.003732957
MSE(10-FLOD CV)	1.076379	2.794973	1.062117

	Ridge(1)	Ridge(5)	Ridge(10)
β_1	2.866508725	2.800204332	2.72341439
β_2	1.425616244	1.418847959	1.40911864
β_3	0.055547419	0.062370569	0.07154456
β_4	0.034240317	0.063780793	0.09520928
β_5	1.998120610	1.910976348	1.81457762
β_6	-0.079853911	-0.027621705	0.02681704
β_7	0.066413440	0.057384666	0.04945193
β_8	-0.002302112	0.003599496	0.01011231
MSE(10-FLOD CV)	1.062871	1.088369	1.16054

	LASSO(0.01)	LASSO(0.02)	LASSO(0.03)(best)
β_1	2.87384810	2.85384810	2.84384810
β_2	1.41713453	1.39713453	1.38713453
β_3	0.04395016	0.02395016	0.01395016
β_4	0.01613556	0.00000000	0.00000000
β_5	2.01152493	1.99152493	1.98152493
β_6	-0.08435019	-0.06435019	-0.05435019
β_7	0.05913830	0.03913830	0.02913830
β_8	0.00000000	0.00000000	0.00000000
MSE(10-FLOD CV)	1.061558	1.058727	1.058422

	LASSO(0.06)	LASSO(0.07)	LASSO(0.1)
β_1	2.823848102	2.81384810	2.783848
β_2	1.367134534	1.35713453	1.327135
β_3	0.000000000	0.00000000	0.000000
β_4	0.000000000	0.00000000	0.000000
β_5	1.961524935	1.95152493	1.921525
β_6	-0.034350188	-0.02435019	0.000000
β_7	0.009138302	0.00000000	0.000000
β_8	0.000000000	0.00000000	0.000000
MSE(10-FLOD CV)	1.059995	1.062444	1.075193

	LARS	PCR(1)	PCR(2)
β_1	2.881790	0.1418095	1.07366482
β_2	1.426205	0.2744360	1.36050173
β_3	0.05341091	0.4870051	1.24892914
β_4	0.02573209	0.5170944	1.03830386
β_5	2.017165	0.6600159	0.36568549
β_6	-0.08726943	0.6982444	0.25290193
β_7	0.06285846e	0.6238862	0.02332634
β_8	0.00000000	0.4874546	0.09587902
MSE(10-FLOD CV)	1.085361	13.19893	6.793834

	PCR(3)	PCR(4)	PCR(5)
β_1	1.583358855	2.2813567	2.70060298
β_2	1.682213722	1.7225987	1.41582113
β_3	0.934048915	0.2991070	-0.21783933
β_4	0.525803347	0.1768183	0.72032498
β_5	0.009141721	0.6924391	0.89498115
β_6	0.325078061	1.1458597	0.91803175
β_7	0.370313155	0.1659987	-0.11568975
β_8	0.560000846	-0.5006352	-0.09733806
MSE(10-FLOD CV)	5.352605	2.68034	1.990125

	PCR(6)	PCR(7)(best)	PLSR(1)
β_1	2.51021539	2.62973868	1.6849685
β_2	1.69634178	1.50931285	1.4135720
β_3	-0.35315082	-0.08799449	0.7097709
β_4	0.64962328	0.37606335	0.7003001
β_5	1.08088675	1.22279518	0.8818097
β_6	0.87965784	0.93931043	0.6799921
β_7	-0.27097345	-0.56730128	0.3491801
β_8	0.01230029	0.20978064	0.3218728
MSE(10-FLOD CV)	1.965921	1.901718	3.988693

	PLSR(2)	PLSR(3)	PLSR(4)
β_1	2.33560880	2.34332329	2.304592614
β_2	1.52665046	1.21781479	1.192662405
β_3	0.16982161	-0.11454513	0.088889655
β_4	0.26610681	0.15698612	0.227207554
β_5	0.85987181	1.46282815	1.652236163
β_6	0.29318736	0.41911755	0.085955781
β_7	-0.12023229	0.04178955	-0.035531100
β_8	-0.05892466	0.02780582	0.008453119
MSE(10-FLOD CV)	2.152358	1.746427	1.642191

	PLSR(5)	PLSR(6)	PLSR(7)(best)
β_1	2.334912782	2.33299317	2.336696071
β_2	1.220006203	1.21900769	1.215898603
β_3	0.110603958	0.13490615	0.128952110
β_4	0.085100731	0.06369072	0.073659022
β_5	1.615193750	1.62072757	1.617248688
β_6	0.004682596	0.01468504	0.009084662
β_7	0.100985886	0.13319603	0.141957997
β_8	0.116025898	0.05221772	0.049785964
MSE(10-FLOD CV)	1.605798	1.602579	1.602391

Question 4 & Question 5 (Sorry, I cannot turn the data on website into csv as a correct form, so I have not done these two question)