Q4. Correlation to choose 6 variables for testing

The CORR Procedure

12 Variables:	fixed_acidity volatile_acidity citric_acid residual_sugar chlorides free_sulfur_dioxide total_sulfur_dioxide density pH sulphates alcohol quality

Simple Statistics

Variable	N	Mean	Std Dev	Sum	Minimum	Maximum
fixed_acidity	1599	8.31964	1.74110	13303	4.60000	15.90000
volatile_acidity	1599	0.52782	0.17906	843.98500	0.12000	1.58000
citric_acid	1599	0.27098	0.19480	433.29000	0	1.00000
residual_sugar	1599	2.53881	1.40993	4060	0.90000	15.50000
chlorides	1599	0.08747	0.04707	139.85900	0.01200	0.61100
free_sulfur_dioxide	1599	15.87492	10.46016	25384	1.00000	72.00000
total_sulfur_dioxide	1599	46.46779	32.89532	74302	6.00000	289.00000
density	1599	0.99675	0.00189	1594	0.99007	1.00369
pH	1599	3.31111	0.15439	5294	2.74000	4.01000
sulphates	1599	0.65815	0.16951	1052	0.33000	2.00000
alcohol	1599	10.42298	1.06567	16666	8.40000	14.90000
quality	1599	5.63602	0.80757	9012	3.00000	8.00000

Q4. Correlation to choose 6 variables for testing

The CORR Procedure

Pearson Correlation Coefficients, N = 1599 Prob > |r| under H0: Rho=0						
	fixed_acidity	**volatile_acidity**	**citric_acid**	**residual_sugar**	**chlorides**	**free_sulfur_dioxide**
fixed_acidity	1.00000	-0.25613 <.0001	0.67170 <.0001	0.11478 <.0001	0.09371 0.0002	-0.15379 <.0001
volatile_acidity	-0.25613 <.0001	1.00000	-0.55250 <.0001	0.00192 0.9389	0.06130 0.0142	-0.01050 0.6747
citric_acid	0.67170 <.0001	-0.55250 <.0001	1.00000	0.14358 <.0001	0.20382 <.0001	-0.06098 0.0147
residual_sugar	0.11478 <.0001	0.00192 0.9389	0.14358 <.0001	1.00000	0.05561 0.0262	0.18705 <.0001
chlorides	0.09371 0.0002	0.06130 0.0142	0.20382 <.0001	0.05561 0.0262	1.00000	0.00556 0.8241
free_sulfur_dioxide	-0.15379 <.0001	-0.01050 0.6747	-0.06098 0.0147	0.18705 <.0001	0.00556 0.8241	1.00000
total_sulfur_dioxide	-0.11318 <.0001	0.07647 0.0022	0.03553 0.1555	0.20303 <.0001	0.04740 0.0581	0.66767 <.0001
density	0.66805 <.0001	0.02203 0.3788	0.36495 <.0001	0.35528 <.0001	0.20063 <.0001	-0.02195 0.3805
pH	-0.68298 <.0001	0.23494 <.0001	-0.54190 <.0001	-0.08565 0.0006	-0.26503 <.0001	0.07038 0.0049
sulphates	0.18301 <.0001	-0.26099 <.0001	0.31277 <.0001	0.00553 0.8252	0.37126 <.0001	0.05166 0.0389
alcohol	-0.06167 0.0136	-0.20229 <.0001	0.10990 <.0001	0.04208 0.0926	-0.22114 <.0001	-0.06941 0.0055
quality	0.12405 <.0001	-0.39056 <.0001	0.22637 <.0001	0.01373 0.5832	-0.12891 <.0001	-0.05066 0.0428

Q4. Correlation to choose 6 variables for testing

The CORR Procedure

Pearson Correlation Coefficients, N = 1599 Prob > |r| under H0: Rho=0						
	total_sulfur_dioxide	**density**	**pH**	**sulphates**	**alcohol**	**quality**
fixed_acidity	-0.11318 <.0001	0.66805 <.0001	-0.68298 <.0001	0.18301 <.0001	-0.06167 0.0136	0.12405 <.0001
volatile_acidity	0.07647 0.0022	0.02203 0.3788	0.23494 <.0001	-0.26099 <.0001	-0.20229 <.0001	-0.39056 <.0001
citric_acid	0.03553 0.1555	0.36495 <.0001	-0.54190 <.0001	0.31277 <.0001	0.10990 <.0001	0.22637 <.0001
residual_sugar	0.20303 <.0001	0.35528 <.0001	-0.08565 0.0006	0.00553 0.8252	0.04208 0.0926	0.01373 0.5832
chlorides	0.04740 0.0581	0.20063 <.0001	-0.26503 <.0001	0.37126 <.0001	-0.22114 <.0001	-0.12891 <.0001
free_sulfur_dioxide	0.66767 <.0001	-0.02195 0.3805	0.07038 0.0049	0.05166 0.0389	-0.06941 0.0055	-0.05066 0.0428
total_sulfur_dioxide	1.00000	0.07127 0.0044	-0.06649 0.0078	0.04295 0.0860	-0.20565 <.0001	-0.18510 <.0001
density	0.07127 0.0044	1.00000	-0.34170 <.0001	0.14851 <.0001	-0.49618 <.0001	-0.17492 <.0001
pH	-0.06649 0.0078	-0.34170 <.0001	1.00000	-0.19665 <.0001	0.20563 <.0001	-0.05773 0.0210
sulphates	0.04295 0.0860	0.14851 <.0001	-0.19665 <.0001	1.00000	0.09359 0.0002	0.25140 <.0001
alcohol	-0.20565 <.0001	-0.49618 <.0001	0.20563 <.0001	0.09359 0.0002	1.00000	0.47617 <.0001
quality	-0.18510 <.0001	-0.17492 <.0001	-0.05773 0.0210	0.25140 <.0001	0.47617 <.0001	1.00000

The REG Procedure
Model: MODEL1
Dependent Variable: quality

Adjusted R-Square Selection Method

Number of Observations Read	1599
Number of Observations Used	1599

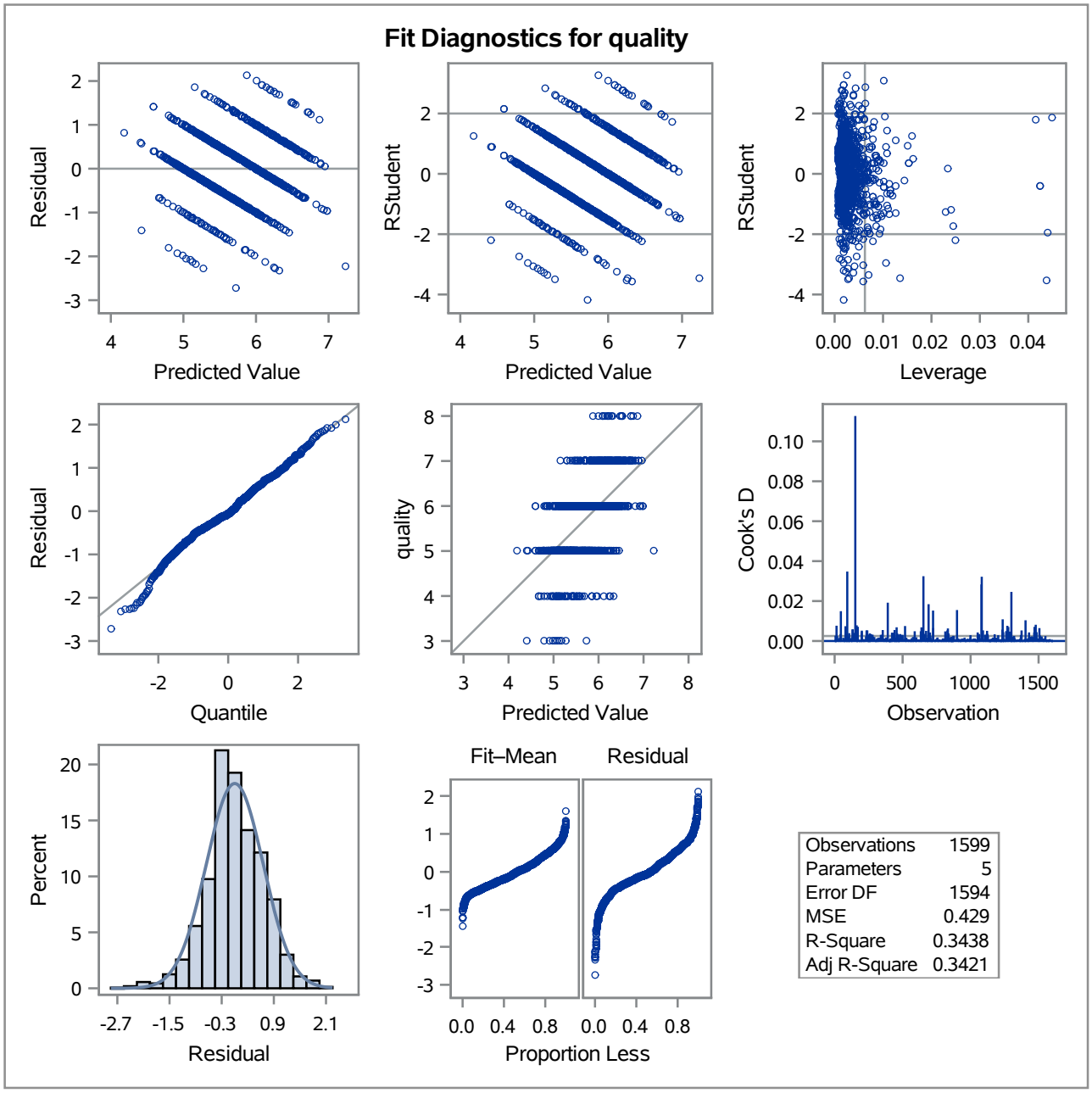
Number in Model	Adjusted R-Square	R-Square	AIC	Variables in Model
4	0.3421	0.3438	-1348.0961	alcohol sulphates volatile_acidity total_sulfur_dioxide
5	0.3418	0.3439	-1346.3480	alcohol sulphates volatile_acidity total_sulfur_dioxide density
5	0.3418	0.3439	-1346.2669	alcohol sulphates volatile_acidity citric_acid total_sulfur_dioxide
6	0.3417	0.3441	-1344.9472	alcohol sulphates volatile_acidity citric_acid total_sulfur_dioxide density
5	0.3347	0.3368	-1329.1890	alcohol sulphates volatile_acidity citric_acid density
3	0.3346	0.3359	-1330.9971	alcohol sulphates volatile_acidity
4	0.3345	0.3361	-1329.5798	alcohol sulphates volatile_acidity citric_acid
4	0.3344	0.3361	-1329.5106	alcohol sulphates volatile_acidity density
4	0.3231	0.3248	-1302.4168	alcohol volatile_acidity total_sulfur_dioxide density
5	0.3226	0.3248	-1300.4170	alcohol volatile_acidity citric_acid total_sulfur_dioxide density
4	0.3219	0.3236	-1299.5763	alcohol volatile_acidity citric_acid total_sulfur_dioxide
3	0.3218	0.3231	-1300.5190	alcohol volatile_acidity total_sulfur_dioxide
3	0.3176	0.3189	-1290.5041	alcohol volatile_acidity density
4	0.3173	0.3190	-1288.7596	alcohol volatile_acidity citric_acid density
2	0.3161	0.3170	-1288.1379	alcohol volatile_acidity
3	0.3159	0.3172	-1286.5729	alcohol volatile_acidity citric_acid
5	0.2946	0.2968	-1235.6153	alcohol sulphates citric_acid total_sulfur_dioxide density
4	0.2934	0.2952	-1233.9150	alcohol sulphates citric_acid total_sulfur_dioxide
4	0.2828	0.2846	-1210.0946	alcohol sulphates citric_acid density
3	0.2823	0.2836	-1209.8558	alcohol sulphates citric_acid
3	0.2791	0.2804	-1202.6801	alcohol sulphates total_sulfur_dioxide
4	0.2790	0.2808	-1201.4928	alcohol sulphates total_sulfur_dioxide density
3	0.2691	0.2705	-1180.7892	alcohol sulphates density
2	0.2690	0.2699	-1181.4811	alcohol sulphates
4	0.2661	0.2679	-1173.1672	alcohol citric_acid total_sulfur_dioxide density
3	0.2660	0.2673	-1173.9018	alcohol citric_acid total_sulfur_dioxide
2	0.2565	0.2574	-1154.3442	alcohol citric_acid
3	0.2563	0.2577	-1152.9338	alcohol citric_acid density
5	0.2421	0.2444	-1120.7061	sulphates volatile_acidity citric_acid total_sulfur_dioxide density
3	0.2378	0.2392	-1113.6856	alcohol total_sulfur_dioxide density
4	0.2360	0.2379	-1109.0004	sulphates volatile_acidity total_sulfur_dioxide density

The REG Procedure
Model: MODEL1
Dependent Variable: quality

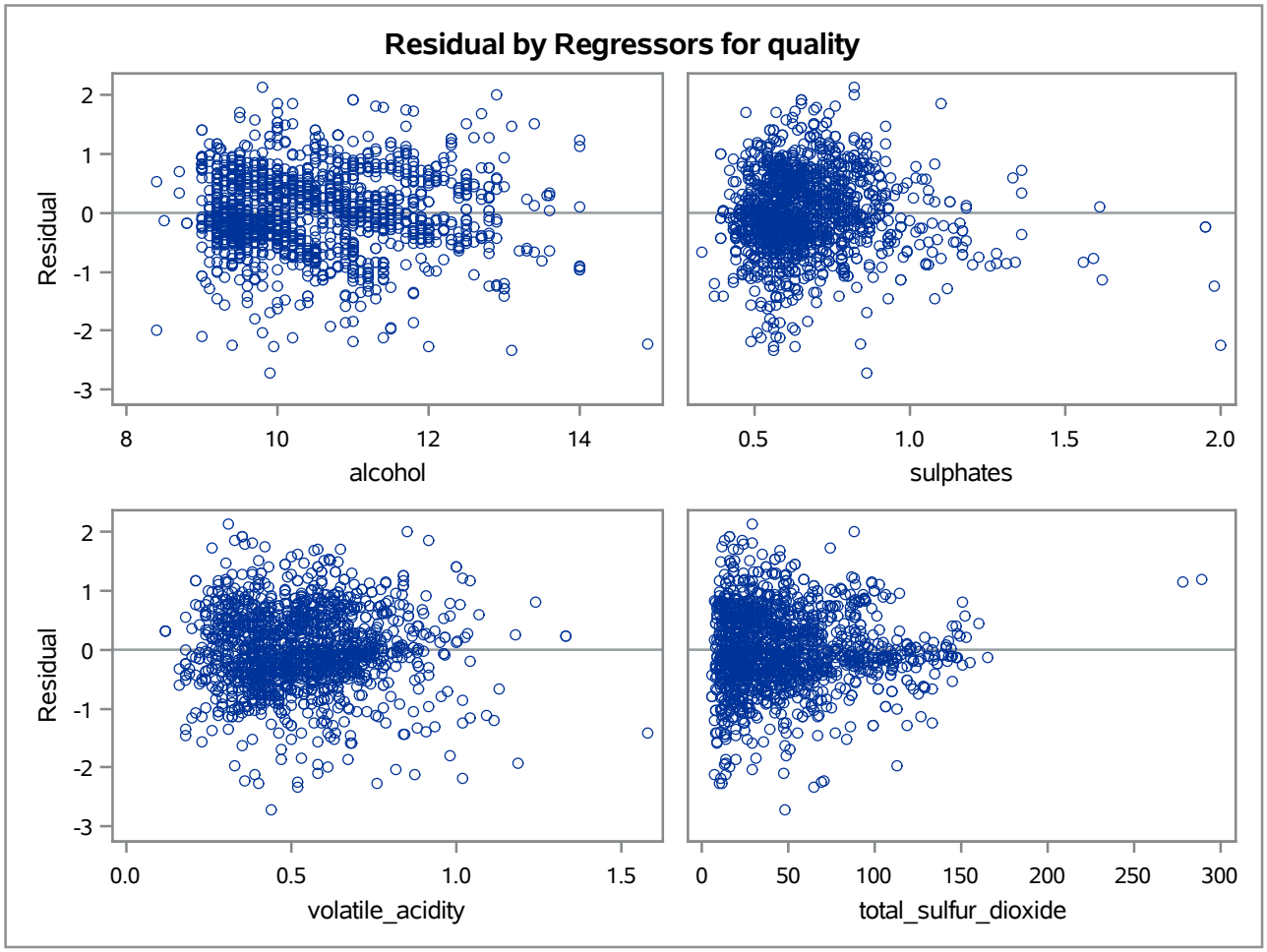
Adjusted R-Square Selection Method

Number in Model	Adjusted R-Square	R-Square	AIC	Variables in Model
2	0.2337	0.2347	-1106.1452	alcohol total_sulfur_dioxide
2	0.2308	0.2317	-1100.0086	alcohol density
1	0.2263	0.2267	-1091.6519	alcohol
4	0.2171	0.2190	-1069.7659	sulphates volatile_acidity citric_acid density
3	0.2125	0.2140	-1061.5069	sulphates volatile_acidity density
4	0.2110	0.2130	-1057.4035	volatile_acidity citric_acid total_sulfur_dioxide density
3	0.2026	0.2041	-1041.5579	sulphates volatile_acidity total_sulfur_dioxide
4	0.2022	0.2042	-1039.6453	sulphates volatile_acidity citric_acid total_sulfur_dioxide
3	0.1996	0.2011	-1035.4435	volatile_acidity total_sulfur_dioxide density
4	0.1995	0.2015	-1034.3639	sulphates citric_acid total_sulfur_dioxide density
3	0.1884	0.1899	-1013.3344	volatile_acidity citric_acid density
2	0.1792	0.1802	-996.2295	volatile_acidity density
3	0.1760	0.1775	-989.0018	volatile_acidity citric_acid total_sulfur_dioxide
2	0.1757	0.1768	-989.5431	volatile_acidity total_sulfur_dioxide
2	0.1755	0.1765	-989.0261	sulphates volatile_acidity
3	0.1754	0.1769	-987.8170	sulphates volatile_acidity citric_acid
3	0.1666	0.1682	-970.9222	sulphates citric_acid density
3	0.1573	0.1588	-953.0681	citric_acid total_sulfur_dioxide density
1	0.1520	0.1525	-945.1412	volatile_acidity
2	0.1516	0.1527	-943.4459	volatile_acidity citric_acid
3	0.1409	0.1425	-922.3707	sulphates total_sulfur_dioxide density
2	0.1267	0.1278	-897.0624	citric_acid density
3	0.1257	0.1273	-894.2172	sulphates citric_acid total_sulfur_dioxide
2	0.1082	0.1093	-863.5197	sulphates density
2	0.1005	0.1016	-849.8972	sulphates total_sulfur_dioxide
2	0.0875	0.0886	-826.8349	citric_acid total_sulfur_dioxide
2	0.0863	0.0874	-824.7294	sulphates citric_acid
1	0.0626	0.0632	-784.8891	sulphates
2	0.0594	0.0606	-778.3737	total_sulfur_dioxide density
1	0.0507	0.0512	-764.6109	citric_acid
1	0.0337	0.0343	-736.2425	total_sulfur_dioxide
1	0.0300	0.0306	-730.1851	density

The REG Procedure
Model: MODEL1
Dependent Variable: quality



The REG Procedure
Model: MODEL1
Dependent Variable: quality



Q4. Regression co-efficients of model chosen after stepwise regression analysis

The REG Procedure
Model: MODEL1
Dependent Variable: quality

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	2.82581	0.20069	14.08	<.0001
alcohol	1	0.29531	0.01603	18.42	<.0001
sulphates	1	0.71214	0.10051	7.08	<.0001
volatile_acidity	1	-1.19856	0.09660	-12.41	<.0001
total_sulfur_dioxide	1	-0.00224	0.00051078	-4.38	<.0001