

P1- Analyzing the NYC Subway Dataset - Linear Regression

May 3, 2015

Ordinary Least Squares (OLS) using StatsModels

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In [1]: # Import commonly used libraries
import pandas
import numpy
import scipy.stats
from ggplot import *
import statsmodels.api as sm
import matplotlib.pyplot as plt
%matplotlib inline

In [2]: # Create a DataFrame to store the turnstile and weather data.
allData = pandas.read_csv ("turnstile_data_master_with_weather.csv")

In [3]: # Setup our features (what we use to predict) and
# value (what we're trying to predict)
# Run OLS to create and evaluate the model
values = allData['ENTRIESn_hourly']
dummies = pandas.get_dummies(allData['UNIT'], prefix='UNIX')
features = allData[['rain', 'Hour', 'fog', 'mintempi']].join(dummies)
model = sm.OLS(values, features)
results = model.fit()
results.summary()
```

Out[3]: <class 'statsmodels.iolib.summary.Summary'>

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"""
                                OLS Regression Results
=====
Dep. Variable:                  ENTRIESn_hourly    R-squared:                0.459
Model:                            OLS             Adj. R-squared:            0.457
Method:                 Least Squares         F-statistic:                238.0
Date:                  Sun, 03 May 2015        Prob (F-statistic):          0.00
Time:                  18:14:20               Log-Likelihood:            -1.1702e+06
No. Observations:                131951         AIC:                     2.341e+06
Df Residuals:                  131482         BIC:                     2.346e+06
Df Model:                        468
Covariance Type:                nonrobust
=====
                                coef    std err          t      P>|t|      [95.0% Conf. Int.]
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rain                -26.9686     11.298     -2.387    0.017    -49.112     -4.825
Hour                 67.3968      0.691    97.582    0.000     66.043     68.750
=====
```

fog	117.2483	14.493	8.090	0.000	88.843	145.654
mintempi	-11.3658	0.764	-14.872	0.000	-12.864	-9.868
UNIX_R001	3910.3146	133.619	29.265	0.000	3648.424	4172.205
UNIX_R002	847.3040	134.615	6.294	0.000	583.462	1111.146
UNIX_R003	148.7739	138.318	1.076	0.282	-122.328	419.876
UNIX_R004	475.2001	136.959	3.470	0.001	206.763	743.637
UNIX_R005	462.3419	137.334	3.367	0.001	193.170	731.514
UNIX_R006	535.0744	132.392	4.042	0.000	275.588	794.561
UNIX_R007	312.6090	139.127	2.247	0.025	39.922	585.296
UNIX_R008	346.7553	141.414	2.452	0.014	69.587	623.924
UNIX_R009	275.5365	138.423	1.991	0.047	4.229	546.844
UNIX_R010	4510.7973	134.980	33.418	0.000	4246.240	4775.355
UNIX_R011	7993.7802	130.208	61.392	0.000	7738.574	8248.986
UNIX_R012	7431.2208	126.753	58.627	0.000	7182.786	7679.655
UNIX_R013	2446.3904	131.746	18.569	0.000	2188.171	2704.610
UNIX_R014	3967.5672	132.367	29.974	0.000	3708.130	4227.004
UNIX_R015	2105.6208	121.889	17.275	0.000	1866.720	2344.521
UNIX_R016	914.9509	132.949	6.882	0.000	654.373	1175.529
UNIX_R017	4189.8343	132.627	31.591	0.000	3929.888	4449.781
UNIX_R018	5894.4736	121.374	48.564	0.000	5656.582	6132.365
UNIX_R019	2859.4787	129.391	22.099	0.000	2605.874	3113.083
UNIX_R020	6464.1897	127.421	50.731	0.000	6214.448	6713.932
UNIX_R021	4427.4463	127.627	34.690	0.000	4177.299	4677.593
UNIX_R022	8589.0774	127.196	67.526	0.000	8339.775	8838.380
UNIX_R023	6509.3842	131.115	49.646	0.000	6252.401	6766.368
UNIX_R024	2988.1313	132.659	22.525	0.000	2728.123	3248.140
UNIX_R025	4991.7822	127.877	39.036	0.000	4741.146	5242.418
UNIX_R027	2911.1584	130.501	22.308	0.000	2655.379	3166.937
UNIX_R028	2246.5314	128.595	17.470	0.000	1994.487	2498.575
UNIX_R029	6542.7938	130.498	50.137	0.000	6287.019	6798.568
UNIX_R030	2783.5270	130.178	21.383	0.000	2528.381	3038.673
UNIX_R031	4485.6484	131.087	34.219	0.000	4228.721	4742.576
UNIX_R032	4097.6167	131.988	31.045	0.000	3838.922	4356.312
UNIX_R033	8417.1327	128.966	65.266	0.000	8164.362	8669.903
UNIX_R034	1006.4424	134.132	7.503	0.000	743.547	1269.338
UNIX_R035	3192.6029	131.176	24.338	0.000	2935.500	3449.705
UNIX_R036	732.1288	136.955	5.346	0.000	463.699	1000.558
UNIX_R037	807.7816	135.259	5.972	0.000	542.677	1072.887
UNIX_R038	175.0727	136.655	1.281	0.200	-92.769	442.914
UNIX_R039	758.6367	140.900	5.384	0.000	482.476	1034.798
UNIX_R040	1165.6344	133.865	8.708	0.000	903.262	1428.007
UNIX_R041	2699.0149	128.704	20.971	0.000	2446.758	2951.272
UNIX_R042	621.8557	134.620	4.619	0.000	358.003	885.708
UNIX_R043	561.6552	77.298	7.266	0.000	410.152	713.158
UNIX_R044	4007.8565	124.112	32.292	0.000	3764.600	4251.113
UNIX_R045	2837.9888	133.628	21.238	0.000	2576.080	3099.897
UNIX_R046	8036.8274	126.885	63.339	0.000	7788.135	8285.520
UNIX_R047	4928.5147	132.685	37.145	0.000	4668.455	5188.574
UNIX_R048	1217.5753	132.322	9.202	0.000	958.226	1476.925
UNIX_R049	2939.2650	132.681	22.153	0.000	2679.213	3199.317
UNIX_R050	3833.2099	134.217	28.560	0.000	3570.147	4096.272
UNIX_R051	5007.5798	132.936	37.669	0.000	4747.028	5268.131
UNIX_R052	1191.2857	138.364	8.610	0.000	920.094	1462.477
UNIX_R053	3112.6927	130.827	23.792	0.000	2856.273	3369.112

UNIX_R054	1354.1022	132.939	10.186	0.000	1093.545	1614.659
UNIX_R055	8193.1823	130.803	62.637	0.000	7936.810	8449.554
UNIX_R056	1488.9071	131.723	11.303	0.000	1230.733	1747.082
UNIX_R057	4617.4224	131.712	35.057	0.000	4359.269	4875.576
UNIX_R058	573.4692	133.276	4.303	0.000	312.251	834.688
UNIX_R059	1177.7097	138.752	8.488	0.000	905.758	1449.661
UNIX_R060	747.1275	134.877	5.539	0.000	482.771	1011.484
UNIX_R061	615.7691	140.641	4.378	0.000	340.115	891.423
UNIX_R062	3765.6972	132.972	28.320	0.000	3505.075	4026.319
UNIX_R063	1148.2254	140.634	8.165	0.000	872.585	1423.866
UNIX_R064	813.4643	137.666	5.909	0.000	543.641	1083.288
UNIX_R065	822.5823	137.713	5.973	0.000	552.666	1092.498
UNIX_R066	295.0935	141.040	2.092	0.036	18.658	571.529
UNIX_R067	899.8860	141.817	6.345	0.000	621.926	1177.846
UNIX_R068	505.8845	141.757	3.569	0.000	228.044	783.725
UNIX_R069	939.7903	137.991	6.811	0.000	669.330	1210.250
UNIX_R070	1605.0942	130.838	12.268	0.000	1348.655	1861.534
UNIX_R079	2463.7808	132.999	18.525	0.000	2203.105	2724.457
UNIX_R080	3757.2262	132.633	28.328	0.000	3497.268	4017.184
UNIX_R081	3377.0921	131.646	25.653	0.000	3119.068	3635.116
UNIX_R082	1394.0257	132.641	10.510	0.000	1134.051	1654.000
UNIX_R083	2909.4158	132.289	21.993	0.000	2650.132	3168.700
UNIX_R084	6963.0038	116.380	59.830	0.000	6734.901	7191.106
UNIX_R085	2331.1165	130.584	17.851	0.000	2075.175	2587.058
UNIX_R086	2333.5081	130.436	17.890	0.000	2077.856	2589.160
UNIX_R087	1150.1154	133.626	8.607	0.000	888.211	1412.020
UNIX_R088	501.8336	134.263	3.738	0.000	238.680	764.987
UNIX_R089	462.0732	132.363	3.491	0.000	202.643	721.503
UNIX_R090	427.5934	140.988	3.033	0.002	151.260	703.927
UNIX_R091	1133.1951	140.230	8.081	0.000	858.347	1408.043
UNIX_R092	1895.4427	134.198	14.124	0.000	1632.418	2158.468
UNIX_R093	1975.0179	133.255	14.821	0.000	1713.840	2236.196
UNIX_R094	1700.4452	134.915	12.604	0.000	1436.014	1964.876
UNIX_R095	2366.6336	135.277	17.495	0.000	2101.493	2631.774
UNIX_R096	2168.8716	132.042	16.426	0.000	1910.071	2427.672
UNIX_R097	2744.4993	126.558	21.686	0.000	2496.449	2992.550
UNIX_R098	2041.9317	132.117	15.455	0.000	1782.985	2300.879
UNIX_R099	2158.6195	131.176	16.456	0.000	1901.516	2415.723
UNIX_R100	510.1338	133.980	3.808	0.000	247.536	772.731
UNIX_R101	3083.7749	132.374	23.296	0.000	2824.325	3343.225
UNIX_R102	3589.6976	130.847	27.434	0.000	3333.240	3846.155
UNIX_R103	1328.2113	135.613	9.794	0.000	1062.412	1594.011
UNIX_R104	1294.6958	134.272	9.642	0.000	1031.525	1557.867
UNIX_R105	3380.2262	132.312	25.547	0.000	3120.896	3639.556
UNIX_R106	1127.6891	140.168	8.045	0.000	852.963	1402.415
UNIX_R107	961.1541	141.049	6.814	0.000	684.701	1237.607
UNIX_R108	5071.9055	134.590	37.684	0.000	4808.111	5335.700
UNIX_R109	1328.1371	134.286	9.890	0.000	1064.938	1591.336
UNIX_R110	3017.9537	133.969	22.527	0.000	2755.376	3280.531
UNIX_R111	2975.2037	131.080	22.698	0.000	2718.289	3232.119
UNIX_R112	1577.6912	132.665	11.892	0.000	1317.671	1837.712
UNIX_R113	1876.7100	134.618	13.941	0.000	1612.861	2140.559
UNIX_R114	861.3839	134.580	6.401	0.000	597.609	1125.158
UNIX_R115	1190.1676	132.338	8.993	0.000	930.788	1449.547

UNIX_R116	3175.9857	131.730	24.110	0.000	2917.797	3434.174
UNIX_R117	942.2246	142.140	6.629	0.000	663.633	1220.817
UNIX_R118	1479.9319	136.320	10.856	0.000	1212.747	1747.117
UNIX_R119	1779.0879	134.572	13.220	0.000	1515.330	2042.846
UNIX_R120	1731.3511	138.031	12.543	0.000	1460.813	2001.889
UNIX_R121	1404.0879	134.941	10.405	0.000	1139.607	1668.569
UNIX_R122	2366.2154	132.682	17.834	0.000	2106.160	2626.270
UNIX_R123	1899.7849	136.998	13.867	0.000	1631.272	2168.298
UNIX_R124	678.1951	138.045	4.913	0.000	407.629	948.761
UNIX_R125	583.0053	133.953	4.352	0.000	320.459	845.551
UNIX_R126	1732.2733	131.999	13.123	0.000	1473.557	1990.989
UNIX_R127	4150.7192	127.797	32.479	0.000	3900.239	4401.199
UNIX_R128	575.1452	134.280	4.283	0.000	311.958	838.332
UNIX_R129	1189.5743	123.242	9.652	0.000	948.023	1431.126
UNIX_R130	444.0566	135.975	3.266	0.001	177.547	710.566
UNIX_R131	3660.3649	130.266	28.099	0.000	3405.045	3915.685
UNIX_R132	3876.2944	132.955	29.155	0.000	3615.705	4136.884
UNIX_R133	1320.9252	136.674	9.665	0.000	1053.047	1588.803
UNIX_R134	640.4935	134.951	4.746	0.000	375.991	904.996
UNIX_R135	983.1279	134.300	7.320	0.000	719.902	1246.354
UNIX_R136	1804.5068	134.619	13.405	0.000	1540.656	2068.357
UNIX_R137	2342.7819	133.311	17.574	0.000	2081.495	2604.069
UNIX_R138	5418.4493	133.036	40.729	0.000	5157.700	5679.198
UNIX_R139	2462.2870	132.942	18.522	0.000	2201.724	2722.850
UNIX_R140	1115.5163	131.274	8.498	0.000	858.221	1372.811
UNIX_R141	3707.7626	133.321	27.811	0.000	3446.455	3969.070
UNIX_R142	3180.5270	134.295	23.683	0.000	2917.312	3443.742
UNIX_R143	2764.3560	133.005	20.784	0.000	2503.668	3025.044
UNIX_R144	3485.7232	135.627	25.701	0.000	3219.897	3751.550
UNIX_R145	662.2370	135.951	4.871	0.000	395.776	928.698
UNIX_R146	1418.2765	136.644	10.379	0.000	1150.456	1686.097
UNIX_R147	2417.5936	135.637	17.824	0.000	2151.748	2683.440
UNIX_R148	884.2931	133.343	6.632	0.000	622.942	1145.644
UNIX_R149	1361.0366	136.299	9.986	0.000	1093.893	1628.180
UNIX_R150	945.9767	137.343	6.888	0.000	676.787	1215.166
UNIX_R151	2141.5163	131.374	16.301	0.000	1884.026	2399.007
UNIX_R152	1736.9751	134.663	12.899	0.000	1473.038	2000.913
UNIX_R153	1959.9030	134.312	14.592	0.000	1696.653	2223.153
UNIX_R154	1189.0232	135.627	8.767	0.000	923.197	1454.850
UNIX_R155	954.0659	134.603	7.088	0.000	690.246	1217.886
UNIX_R156	784.9562	132.701	5.915	0.000	524.866	1045.047
UNIX_R157	1051.6620	135.300	7.773	0.000	786.476	1316.848
UNIX_R158	3635.2151	135.646	26.799	0.000	3369.352	3901.078
UNIX_R159	1853.5656	134.358	13.796	0.000	1590.227	2116.904
UNIX_R160	2464.3332	136.306	18.079	0.000	2197.175	2731.491
UNIX_R161	1233.4192	130.075	9.482	0.000	978.475	1488.363
UNIX_R163	3035.6380	130.847	23.200	0.000	2779.180	3292.096
UNIX_R164	2823.2089	129.656	21.775	0.000	2569.086	3077.332
UNIX_R165	-63.7028	133.651	-0.477	0.634	-325.656	198.250
UNIX_R166	2365.9716	135.278	17.490	0.000	2100.829	2631.115
UNIX_R167	2624.0578	133.953	19.589	0.000	2361.512	2886.603
UNIX_R168	5052.0637	132.060	38.256	0.000	4793.228	5310.900
UNIX_R169	2059.4120	134.273	15.338	0.000	1796.240	2322.584
UNIX_R170	1.173e+04	118.775	98.752	0.000	1.15e+04	1.2e+04

UNIX_R171	1200.9406	131.752	9.115	0.000	942.710	1459.172
UNIX_R172	1790.8683	132.954	13.470	0.000	1530.282	2051.455
UNIX_R173	1100.9356	120.740	9.118	0.000	864.288	1337.583
UNIX_R174	1465.0418	137.326	10.668	0.000	1195.885	1734.199
UNIX_R175	5680.9861	134.264	42.312	0.000	5417.831	5944.141
UNIX_R176	3696.2445	131.164	28.180	0.000	3439.165	3953.324
UNIX_R177	4552.1820	132.948	34.240	0.000	4291.605	4812.759
UNIX_R178	4971.5258	133.638	37.201	0.000	4709.598	5233.454
UNIX_R179	7938.2749	128.838	61.615	0.000	7685.756	8190.794
UNIX_R180	2175.3575	134.925	16.123	0.000	1910.906	2439.809
UNIX_R181	1652.6898	133.611	12.369	0.000	1390.815	1914.565
UNIX_R182	2437.7694	137.285	17.757	0.000	2168.693	2706.845
UNIX_R183	873.8754	137.676	6.347	0.000	604.033	1143.718
UNIX_R184	1062.7836	140.259	7.577	0.000	787.878	1337.689
UNIX_R185	936.7722	136.277	6.874	0.000	669.672	1203.872
UNIX_R186	1125.6477	121.375	9.274	0.000	887.756	1363.540
UNIX_R187	1702.5901	134.636	12.646	0.000	1438.706	1966.475
UNIX_R188	2496.3432	132.985	18.772	0.000	2235.694	2756.992
UNIX_R189	1603.2231	136.953	11.706	0.000	1334.798	1871.648
UNIX_R190	2029.5337	135.319	14.998	0.000	1764.311	2294.756
UNIX_R191	1834.4856	135.969	13.492	0.000	1567.988	2100.983
UNIX_R192	1872.8314	132.985	14.083	0.000	1612.184	2133.479
UNIX_R193	1385.6771	134.950	10.268	0.000	1121.177	1650.177
UNIX_R194	1942.9594	135.550	14.334	0.000	1677.284	2208.635
UNIX_R195	4286.8337	131.716	32.546	0.000	4028.672	4544.995
UNIX_R196	1333.6855	136.277	9.787	0.000	1066.586	1600.785
UNIX_R197	1721.8621	135.627	12.696	0.000	1456.036	1987.689
UNIX_R198	2293.0217	133.608	17.162	0.000	2031.153	2554.890
UNIX_R199	715.6447	134.611	5.316	0.000	451.810	979.480
UNIX_R200	1439.0817	134.938	10.665	0.000	1174.606	1703.558
UNIX_R201	3058.9986	132.357	23.112	0.000	2799.581	3318.416
UNIX_R202	1905.6374	128.421	14.839	0.000	1653.934	2157.341
UNIX_R203	1715.0489	135.628	12.645	0.000	1449.220	1980.878
UNIX_R204	1510.3209	132.331	11.413	0.000	1250.954	1769.688
UNIX_R205	1810.4719	132.391	13.675	0.000	1550.989	2069.955
UNIX_R206	1924.3589	133.956	14.366	0.000	1661.808	2186.909
UNIX_R207	1886.9758	132.316	14.261	0.000	1627.639	2146.313
UNIX_R208	2676.7697	133.585	20.038	0.000	2414.945	2938.594
UNIX_R209	857.4114	140.588	6.099	0.000	581.862	1132.960
UNIX_R210	572.6129	136.313	4.201	0.000	305.442	839.784
UNIX_R211	1876.2489	121.345	15.462	0.000	1638.414	2114.083
UNIX_R212	1652.4928	134.264	12.308	0.000	1389.338	1915.648
UNIX_R213	1173.4694	136.977	8.567	0.000	904.998	1441.941
UNIX_R214	743.4078	141.003	5.272	0.000	467.044	1019.772
UNIX_R215	1512.0057	132.356	11.424	0.000	1252.590	1771.421
UNIX_R216	754.1082	134.008	5.627	0.000	491.455	1016.761
UNIX_R217	1452.3607	140.290	10.353	0.000	1177.394	1727.327
UNIX_R218	1781.3196	129.968	13.706	0.000	1526.585	2036.054
UNIX_R219	1136.7587	129.973	8.746	0.000	882.013	1391.504
UNIX_R220	1304.8814	128.486	10.156	0.000	1053.051	1556.712
UNIX_R221	1425.1197	138.790	10.268	0.000	1153.094	1697.146
UNIX_R222	2225.9894	134.949	16.495	0.000	1961.491	2490.487
UNIX_R223	2063.8668	133.929	15.410	0.000	1801.368	2326.366
UNIX_R224	772.2836	137.323	5.624	0.000	503.134	1041.433

UNIX_R225	551.8541	133.286	4.140	0.000	290.615	813.093
UNIX_R226	795.1396	139.454	5.702	0.000	521.813	1068.467
UNIX_R227	1109.0200	135.590	8.179	0.000	843.266	1374.774
UNIX_R228	1057.1238	137.014	7.715	0.000	788.578	1325.669
UNIX_R229	640.2527	140.583	4.554	0.000	364.713	915.792
UNIX_R230	550.5951	136.273	4.040	0.000	283.503	817.687
UNIX_R231	971.3698	135.316	7.179	0.000	706.153	1236.587
UNIX_R232	1092.5120	139.089	7.855	0.000	819.900	1365.124
UNIX_R233	1125.0626	140.310	8.018	0.000	850.057	1400.069
UNIX_R234	409.3437	140.329	2.917	0.004	134.302	684.386
UNIX_R235	3481.9398	131.086	26.562	0.000	3225.013	3738.867
UNIX_R236	1494.0123	134.288	11.125	0.000	1230.811	1757.214
UNIX_R237	705.2950	140.256	5.029	0.000	430.396	980.194
UNIX_R238	2003.3396	133.244	15.035	0.000	1742.183	2264.496
UNIX_R239	901.7206	126.279	7.141	0.000	654.217	1149.224
UNIX_R240	3455.6963	133.906	25.807	0.000	3193.244	3718.149
UNIX_R241	395.5353	133.642	2.960	0.003	133.600	657.470
UNIX_R242	599.6538	136.969	4.378	0.000	331.196	868.111
UNIX_R243	1345.7619	136.637	9.849	0.000	1077.956	1613.568
UNIX_R244	1277.2713	124.807	10.234	0.000	1032.652	1521.890
UNIX_R246	743.8802	140.619	5.290	0.000	468.270	1019.491
UNIX_R247	244.0121	141.830	1.720	0.085	-33.971	521.996
UNIX_R248	3243.9343	133.603	24.280	0.000	2982.075	3505.794
UNIX_R249	1361.0422	135.909	10.014	0.000	1094.664	1627.421
UNIX_R250	1016.2917	137.297	7.402	0.000	747.191	1285.392
UNIX_R251	1269.0034	134.929	9.405	0.000	1004.546	1533.461
UNIX_R252	937.5621	133.925	7.001	0.000	675.071	1200.053
UNIX_R253	706.2034	139.944	5.046	0.000	431.915	980.492
UNIX_R254	2427.6863	131.733	18.429	0.000	2169.492	2685.881
UNIX_R255	784.3128	135.603	5.784	0.000	518.533	1050.093
UNIX_R256	1016.1395	132.642	7.661	0.000	756.164	1276.114
UNIX_R257	1783.6997	132.666	13.445	0.000	1523.677	2043.722
UNIX_R258	1719.9794	133.915	12.844	0.000	1457.509	1982.450
UNIX_R259	966.2432	137.661	7.019	0.000	696.431	1236.056
UNIX_R260	1564.4747	143.606	10.894	0.000	1283.009	1845.940
UNIX_R261	1517.2092	135.560	11.192	0.000	1251.514	1782.905
UNIX_R262	554.4407	143.396	3.867	0.000	273.387	835.494
UNIX_R263	107.4271	129.173	0.832	0.406	-145.749	360.603
UNIX_R264	447.1935	132.390	3.378	0.001	187.711	706.676
UNIX_R265	943.7661	139.480	6.766	0.000	670.389	1217.143
UNIX_R266	878.7632	133.310	6.592	0.000	617.478	1140.048
UNIX_R267	1159.8425	132.349	8.763	0.000	900.440	1419.245
UNIX_R268	2142.0125	134.978	15.869	0.000	1877.459	2406.566
UNIX_R269	855.0033	133.040	6.427	0.000	594.247	1115.759
UNIX_R270	545.2058	140.655	3.876	0.000	269.525	820.886
UNIX_R271	408.4548	139.135	2.936	0.003	135.754	681.156
UNIX_R272	1713.1905	134.599	12.728	0.000	1449.378	1977.003
UNIX_R273	1488.5985	139.215	10.693	0.000	1215.739	1761.458
UNIX_R274	958.7619	138.368	6.929	0.000	687.563	1229.961
UNIX_R275	635.2002	123.809	5.130	0.000	392.537	877.864
UNIX_R276	1281.2909	130.495	9.819	0.000	1025.523	1537.059
UNIX_R277	539.6722	142.975	3.775	0.000	259.443	819.901
UNIX_R278	419.1136	138.843	3.019	0.003	146.984	691.243
UNIX_R279	769.3227	134.229	5.731	0.000	506.237	1032.409

UNIX_R280	692.0505	142.520	4.856	0.000	412.715	971.386
UNIX_R281	1228.1188	133.597	9.193	0.000	966.270	1489.967
UNIX_R282	1554.2807	134.922	11.520	0.000	1289.835	1818.726
UNIX_R283	601.0490	132.462	4.538	0.000	341.426	860.672
UNIX_R284	745.6114	133.265	5.595	0.000	484.414	1006.808
UNIX_R285	559.1399	134.989	4.142	0.000	294.564	823.716
UNIX_R286	533.0940	133.955	3.980	0.000	270.544	795.644
UNIX_R287	635.7260	141.784	4.484	0.000	357.832	913.620
UNIX_R288	1838.1344	135.627	13.553	0.000	1572.308	2103.961
UNIX_R289	368.1870	134.608	2.735	0.006	104.357	632.017
UNIX_R290	1744.3123	134.962	12.924	0.000	1479.789	2008.835
UNIX_R291	1675.4312	131.387	12.752	0.000	1417.915	1932.947
UNIX_R292	433.0551	135.662	3.192	0.001	167.161	698.949
UNIX_R293	6539.1675	131.771	49.625	0.000	6280.899	6797.436
UNIX_R294	952.5056	136.942	6.956	0.000	684.102	1220.909
UNIX_R295	646.4610	154.533	4.183	0.000	343.580	949.342
UNIX_R296	480.7754	136.304	3.527	0.000	213.623	747.928
UNIX_R297	773.4217	135.632	5.702	0.000	507.585	1039.259
UNIX_R298	863.4620	133.960	6.446	0.000	600.903	1126.021
UNIX_R299	379.5661	135.950	2.792	0.005	113.107	646.025
UNIX_R300	2563.4559	133.991	19.132	0.000	2300.836	2826.076
UNIX_R301	961.3295	135.612	7.089	0.000	695.532	1227.127
UNIX_R302	1853.6613	133.616	13.873	0.000	1591.776	2115.547
UNIX_R303	1202.0155	135.271	8.886	0.000	936.886	1467.145
UNIX_R304	981.2596	130.806	7.502	0.000	724.882	1237.637
UNIX_R306	219.6633	135.335	1.623	0.105	-45.591	484.917
UNIX_R307	418.7998	142.189	2.945	0.003	140.111	697.488
UNIX_R308	773.2854	135.546	5.705	0.000	507.618	1038.953
UNIX_R309	809.6992	138.784	5.834	0.000	537.685	1081.714
UNIX_R310	1562.8913	134.861	11.589	0.000	1298.565	1827.217
UNIX_R311	433.4644	138.777	3.123	0.002	161.463	705.465
UNIX_R312	293.7308	131.306	2.237	0.025	36.373	551.089
UNIX_R313	146.1036	142.170	1.028	0.304	-132.547	424.754
UNIX_R314	536.9412	134.964	3.978	0.000	272.415	801.468
UNIX_R315	484.7757	136.658	3.547	0.000	216.929	752.623
UNIX_R316	183.7838	133.984	1.372	0.170	-78.822	446.389
UNIX_R317	632.4905	135.952	4.652	0.000	366.027	898.954
UNIX_R318	533.4222	134.243	3.974	0.000	270.309	796.536
UNIX_R319	2031.2253	133.621	15.201	0.000	1769.331	2293.120
UNIX_R320	714.2792	134.949	5.293	0.000	449.782	978.776
UNIX_R321	1002.8230	131.716	7.614	0.000	744.663	1260.983
UNIX_R322	1737.3209	136.620	12.716	0.000	1469.549	2005.093
UNIX_R323	1252.4096	136.953	9.145	0.000	983.984	1520.836
UNIX_R324	1470.1050	133.994	10.971	0.000	1207.479	1732.731
UNIX_R325	373.2381	139.102	2.683	0.007	100.600	645.876
UNIX_R326	269.0667	135.618	1.984	0.047	3.258	534.875
UNIX_R327	867.7609	135.294	6.414	0.000	602.587	1132.935
UNIX_R328	821.7007	134.349	6.116	0.000	558.380	1085.022
UNIX_R329	155.3038	136.643	1.137	0.256	-112.514	423.122
UNIX_R330	991.9012	138.381	7.168	0.000	720.678	1263.125
UNIX_R331	268.1258	135.962	1.972	0.049	1.644	534.608
UNIX_R332	641.5030	133.985	4.788	0.000	378.895	904.110
UNIX_R333	760.7885	134.304	5.665	0.000	497.556	1024.021
UNIX_R334	892.1114	134.332	6.641	0.000	628.823	1155.400

UNIX_R335	441.6950	143.339	3.081	0.002	160.753	722.637
UNIX_R336	57.8222	142.137	0.407	0.684	-220.764	336.409
UNIX_R337	102.7926	140.218	0.733	0.464	-172.033	377.618
UNIX_R338	-31.0993	137.315	-0.226	0.821	-300.235	238.036
UNIX_R339	378.8213	132.075	2.868	0.004	119.957	637.686
UNIX_R340	405.6718	137.029	2.960	0.003	137.098	674.245
UNIX_R341	479.8047	135.229	3.548	0.000	214.758	744.852
UNIX_R342	617.2630	134.957	4.574	0.000	352.751	881.775
UNIX_R343	666.1584	134.651	4.947	0.000	402.244	930.073
UNIX_R344	461.9302	141.390	3.267	0.001	184.809	739.051
UNIX_R345	499.4716	138.792	3.599	0.000	227.442	771.502
UNIX_R346	1149.9781	133.615	8.607	0.000	888.095	1411.861
UNIX_R347	656.3788	135.627	4.840	0.000	390.552	922.205
UNIX_R348	167.3632	138.457	1.209	0.227	-104.010	438.737
UNIX_R349	547.8187	136.659	4.009	0.000	279.969	815.669
UNIX_R350	304.6649	135.950	2.241	0.025	38.206	571.124
UNIX_R352	344.4066	143.440	2.401	0.016	63.266	625.547
UNIX_R353	573.0048	134.608	4.257	0.000	309.175	836.834
UNIX_R354	218.2106	141.421	1.543	0.123	-58.971	495.393
UNIX_R355	247.8163	133.350	1.858	0.063	-13.546	509.179
UNIX_R356	1067.0215	137.283	7.772	0.000	797.949	1336.094
UNIX_R357	79.4288	135.627	0.586	0.558	-186.398	345.255
UNIX_R358	252.1239	140.987	1.788	0.074	-24.209	528.457
UNIX_R359	1881.0347	122.567	15.347	0.000	1640.805	2121.264
UNIX_R360	73.0545	136.298	0.536	0.592	-194.086	340.195
UNIX_R361	1098.5281	132.086	8.317	0.000	839.642	1357.414
UNIX_R362	711.2030	141.041	5.043	0.000	434.765	987.641
UNIX_R363	365.8220	134.920	2.711	0.007	101.381	630.263
UNIX_R364	907.5528	134.287	6.758	0.000	644.353	1170.753
UNIX_R365	371.2473	136.289	2.724	0.006	104.124	638.371
UNIX_R366	523.3912	135.266	3.869	0.000	258.271	788.511
UNIX_R367	656.7788	135.627	4.843	0.000	390.952	922.605
UNIX_R368	648.6596	137.682	4.711	0.000	378.805	918.514
UNIX_R369	402.1301	135.286	2.972	0.003	136.971	667.289
UNIX_R370	493.2194	137.003	3.600	0.000	224.696	761.743
UNIX_R371	711.5551	137.701	5.167	0.000	441.664	981.446
UNIX_R372	739.5166	140.251	5.273	0.000	464.627	1014.406
UNIX_R373	625.4431	141.004	4.436	0.000	349.078	901.808
UNIX_R374	786.3110	135.980	5.783	0.000	519.793	1052.829
UNIX_R375	525.4720	134.948	3.894	0.000	260.975	789.968
UNIX_R376	414.6455	135.627	3.057	0.002	148.819	680.472
UNIX_R377	1126.0972	135.618	8.303	0.000	860.288	1391.906
UNIX_R378	1334.7955	135.627	9.842	0.000	1068.969	1600.622
UNIX_R379	581.5365	135.957	4.277	0.000	315.064	848.009
UNIX_R380	773.1955	135.627	5.701	0.000	507.369	1039.022
UNIX_R381	741.9844	135.627	5.471	0.000	476.158	1007.811
UNIX_R382	906.8555	137.307	6.605	0.000	637.736	1175.975
UNIX_R383	494.5648	135.276	3.656	0.000	229.426	759.703
UNIX_R384	273.5066	135.627	2.017	0.044	7.680	539.333
UNIX_R385	987.5994	133.354	7.406	0.000	726.229	1248.970
UNIX_R386	900.2788	135.627	6.638	0.000	634.452	1166.105
UNIX_R387	938.3802	132.093	7.104	0.000	679.480	1197.281
UNIX_R388	975.6178	135.624	7.194	0.000	709.796	1241.439
UNIX_R389	285.3446	135.964	2.099	0.036	18.858	551.831

UNIX_R390	1464.2402	136.639	10.716	0.000	1196.429	1732.051
UNIX_R391	837.5218	134.969	6.205	0.000	572.985	1102.059
UNIX_R392	805.7399	135.627	5.941	0.000	539.913	1071.566
UNIX_R393	494.0955	135.627	3.643	0.000	228.269	759.922
UNIX_R394	949.5264	136.701	6.946	0.000	681.595	1217.458
UNIX_R395	664.5152	136.649	4.863	0.000	396.685	932.345
UNIX_R396	495.1862	135.972	3.642	0.000	228.684	761.688
UNIX_R397	287.5787	136.652	2.104	0.035	19.744	555.414
UNIX_R398	759.7130	136.644	5.560	0.000	491.894	1027.532
UNIX_R399	474.6955	135.627	3.500	0.000	208.869	740.522
UNIX_R400	354.4502	135.969	2.607	0.009	87.953	620.947
UNIX_R401	283.2241	134.603	2.104	0.035	19.405	547.043
UNIX_R402	238.4557	135.954	1.754	0.079	-28.012	504.924
UNIX_R403	439.4828	137.033	3.207	0.001	170.901	708.064
UNIX_R404	661.2630	137.353	4.814	0.000	392.054	930.472
UNIX_R405	629.4806	136.283	4.619	0.000	362.368	896.593
UNIX_R406	927.3753	135.294	6.855	0.000	662.202	1192.548
UNIX_R407	333.8383	135.974	2.455	0.014	67.331	600.346
UNIX_R408	1244.9485	133.949	9.294	0.000	982.411	1507.486
UNIX_R409	497.4388	133.970	3.713	0.000	234.860	760.018
UNIX_R411	219.1288	135.627	1.616	0.106	-46.698	484.955
UNIX_R412	217.7375	136.286	1.598	0.110	-49.381	484.856
UNIX_R413	399.3543	135.967	2.937	0.003	132.861	665.847
UNIX_R414	215.3844	135.627	1.588	0.112	-50.442	481.211
UNIX_R415	-72.5848	133.640	-0.543	0.587	-334.516	189.346
UNIX_R416	121.8924	135.602	0.899	0.369	-143.886	387.671
UNIX_R417	19.2410	147.874	0.130	0.896	-270.589	309.071
UNIX_R418	-71.4424	136.988	-0.522	0.602	-339.936	197.052
UNIX_R419	26.1186	135.968	0.192	0.848	-240.376	292.613
UNIX_R420	537.1116	134.949	3.980	0.000	272.613	801.610
UNIX_R421	231.2378	135.954	1.701	0.089	-35.230	497.706
UNIX_R422	108.9824	136.648	0.798	0.425	-158.845	376.810
UNIX_R423	401.7913	134.941	2.978	0.003	137.309	666.273
UNIX_R424	386.1408	141.076	2.737	0.006	109.634	662.647
UNIX_R425	233.7152	136.678	1.710	0.087	-34.171	501.602
UNIX_R426	139.3280	134.946	1.032	0.302	-125.164	403.820
UNIX_R427	169.1766	136.335	1.241	0.215	-98.037	436.390
UNIX_R428	358.0010	135.627	2.640	0.008	92.175	623.828
UNIX_R429	934.2906	133.249	7.012	0.000	673.125	1195.456
UNIX_R430	351.1896	137.713	2.550	0.011	81.275	621.104
UNIX_R431	529.8060	135.972	3.896	0.000	263.303	796.309
UNIX_R432	362.0290	136.980	2.643	0.008	93.551	630.507
UNIX_R433	270.7451	137.371	1.971	0.049	1.501	539.989
UNIX_R434	315.5155	137.356	2.297	0.022	46.300	584.731
UNIX_R435	377.9841	137.387	2.751	0.006	108.709	647.259
UNIX_R436	382.1269	134.295	2.845	0.004	118.911	645.343
UNIX_R437	639.5366	136.324	4.691	0.000	372.344	906.729
UNIX_R438	657.9829	137.025	4.802	0.000	389.416	926.549
UNIX_R439	600.2579	133.954	4.481	0.000	337.710	862.806
UNIX_R440	304.8361	137.729	2.213	0.027	34.889	574.783
UNIX_R441	335.6755	137.395	2.443	0.015	66.385	604.966
UNIX_R442	338.4899	135.627	2.496	0.013	72.663	604.316
UNIX_R443	839.4788	135.627	6.190	0.000	573.652	1105.305
UNIX_R444	372.8565	136.315	2.735	0.006	105.681	640.032

UNIX_R445	971.2672	135.637	7.161	0.000	705.421	1237.113
UNIX_R446	806.8532	134.945	5.979	0.000	542.363	1071.343
UNIX_R447	417.2061	135.272	3.084	0.002	152.076	682.337
UNIX_R448	-1.1626	130.812	-0.009	0.993	-257.551	255.226
UNIX_R449	545.9288	135.627	4.025	0.000	280.102	811.755
UNIX_R450	451.9610	139.990	3.229	0.001	177.582	726.340
UNIX_R451	875.3284	133.950	6.535	0.000	612.789	1137.868
UNIX_R452	5695.1620	134.274	42.414	0.000	5431.987	5958.337
UNIX_R453	1793.9958	143.352	12.515	0.000	1513.028	2074.963
UNIX_R454	138.8141	140.651	0.987	0.324	-136.859	414.488
UNIX_R455	85.3322	139.880	0.610	0.542	-188.830	359.494
UNIX_R456	210.3060	133.290	1.578	0.115	-50.941	471.553
UNIX_R459	77.3864	194.869	0.397	0.691	-304.553	459.326
UNIX_R460	1496.6063	134.261	11.147	0.000	1233.456	1759.756
UNIX_R461	3045.0935	133.673	22.780	0.000	2783.096	3307.091
UNIX_R462	1978.5889	134.607	14.699	0.000	1714.762	2242.416
UNIX_R463	3062.4702	131.801	23.236	0.000	2804.143	3320.798
UNIX_R464	-57.2859	141.802	-0.404	0.686	-335.215	220.643
UNIX_R468	401.9927	134.969	2.978	0.003	137.456	666.529
UNIX_R469	405.4288	135.627	2.989	0.003	139.602	671.255
UNIX_R535	398.3584	131.836	3.022	0.003	139.962	656.754
UNIX_R536	410.1210	109.255	3.754	0.000	195.984	624.258
UNIX_R540	113.0380	50.743	2.228	0.026	13.582	212.494
UNIX_R541	6.0300	49.103	0.123	0.902	-90.210	102.270
UNIX_R542	-13.4721	62.629	-0.215	0.830	-136.223	109.279
UNIX_R543	-50.7666	51.246	-0.991	0.322	-151.207	49.674
UNIX_R544	-63.7413	58.208	-1.095	0.273	-177.829	50.346
UNIX_R545	-14.6832	59.522	-0.247	0.805	-131.345	101.978
UNIX_R546	124.1397	60.020	2.068	0.039	6.502	241.778
UNIX_R547	18.3903	74.742	0.246	0.806	-128.102	164.883
UNIX_R548	52.9185	81.686	0.648	0.517	-107.185	213.022
UNIX_R549	-88.0066	46.445	-1.895	0.058	-179.039	3.026
UNIX_R550	-50.1386	48.261	-1.039	0.299	-144.729	44.452
UNIX_R551	-22.3998	53.569	-0.418	0.676	-127.395	82.595
UNIX_R552	42.6873	52.605	0.811	0.417	-60.417	145.791

```
=====
Omnibus:                121586.030    Durbin-Watson:                1.592
Prob(Omnibus):           0.000    Jarque-Bera (JB):            15266700.009
Skew:                    4.026    Prob(JB):                     0.00
Kurtosis:                55.076    Cond. No.                    1.15e+04
=====
```

Warnings:

[1] Standard Errors assume that the covariance matrix of the errors is correctly specified.
 [2] The condition number is large, 1.15e+04. This might indicate that there are strong multicollinearity or other numerical problems.

"""

```
In [4]: plt.plot(values - results.predict())
plt.show()
```

