univariate gam

Generalized additive Poisson model

$$\ln(patient) = Intercept + \beta \times Airpollution + s(temperature) + s(humidity) + s(time)$$

s= a cyclic cubic regression splines

下列依不同的空汙指標分別做單變數 Generalized additive Poisson model，並以時間趨勢、當天的溫度與濕度作為共變量做平滑函數的擬合，下列各空汙列出了不同的滯後天數 (row, 當天 前七天) 與不同的移動平均天數 (colum, 當天平均 七天平均) 的模型結果 (p-value 與空汙估計係數)

CO

Table 1: linear term p-value with lag and moving average data

	p.pv	mv2	mv3	mv4	mv5	mv6	mv7
1	0.013	0.090	0.567	0.658	0.441	0.681	0.700
2	0.308	0.355	0.398	0.820	0.629	0.369	0.480
3	0.183	0.878	0.310	0.274	0.535	0.307	0.106
4	0.145	0.039	0.282	0.061	0.079	0.251	0.139
5	0.542	0.350	0.122	0.383	0.112	0.160	0.413
6	0.661	0.379	0.170	0.059	0.188	0.031	0.027
7	0.432	0.602	0.312	0.266	0.165	0.454	0.148
8	0.388	0.237	0.193	0.627	0.996	0.562	0.810

row:lag days,col:moving average for the n days

Table 2: Parametric coefficients with lag and moving average data

	beta	mv2	mv3	mv4	mv5	mv6	mv7
1	0.559	0.462	0.177	0.155	0.306	0.184	0.189
2	-0.236	0.250	0.259	0.079	0.191	0.400	0.345
3	0.302	-0.042	0.310	0.381	0.245	0.454	0.790
4	0.332	0.558	0.330	0.649	0.692	0.511	0.722
5	0.141	0.256	0.474	0.305	0.628	0.625	0.401
6	-0.103	0.242	0.421	0.654	0.518	0.956	1.080
7	0.185	0.146	0.315	0.388	0.545	0.332	0.707
8	-0.203	-0.330	-0.408	-0.171	0.002	0.257	0.118

SO2

Table 3: linear term p-value with lag and moving average data

	p.pv	mv2	mv3	mv4	mv5	mv6	mv7
1	0.485	0.004	0.494	0.142	0.242	0.740	0.989
2	0.337	0.807	0.024	0.400	0.076	0.133	0.469
3	0.000	0.004	0.002	0.000	0.003	0.000	0.000
4	0.004	0.144	0.524	0.203	0.010	0.135	0.025
5	0.704	0.065	0.254	0.706	0.295	0.024	0.170
6	0.856	0.818	0.179	0.237	0.552	0.264	0.026
7	0.025	0.036	0.128	0.006	0.519	0.235	0.473
8	0.179	0.681	0.693	0.771	0.168	0.611	0.792

row:lag days,col:moving average for the n days

Table 4: Parametric coefficients with lag and moving average data

	beta	mv2	mv3	mv4	mv5	mv6	mv7
1	0.013	0.072	0.021	0.052	0.045	0.014	0.001
2	-0.019	0.006	0.070	0.030	0.068	0.062	0.032
3	0.073	0.072	0.097	0.150	0.114	0.155	0.163
4	-0.061	0.037	0.020	0.045	0.099	0.062	0.098
5	0.007	-0.051	0.036	0.013	0.040	0.093	0.060
6	-0.003	0.006	-0.043	0.042	0.023	0.046	0.098
7	-0.047	-0.058	-0.050	-0.099	-0.025	-0.049	-0.032
8	0.024	-0.011	-0.012	-0.010	-0.053	0.021	0.012

O3

Table 5: linear term p-value with lag and moving average data

	p.pv	mv2	mv3	mv4	mv5	mv6	mv7
1	0.686	0.765	0.354	0.336	0.158	0.138	0.090
2	0.178	0.145	0.188	0.064	0.053	0.022	0.014
3	0.508	0.219	0.128	0.133	0.046	0.032	0.014
4	0.001	0.049	0.050	0.051	0.072	0.033	0.027
5	0.673	0.133	0.264	0.176	0.126	0.120	0.053
6	0.092	0.317	0.503	0.580	0.431	0.351	0.350
7	0.543	0.210	0.259	0.978	0.966	0.867	0.735
8	0.113	0.505	0.323	0.412	0.757	0.686	0.465

row:lag days,col:moving average for the n days

Table 6: Parametric coefficients with lag and moving average data

	beta	mv2	mv3	mv4	mv5	mv6	mv7
1	0.001	0.001	0.002	0.002	0.003	0.004	0.004
2	0.002	0.003	0.003	0.004	0.005	0.006	0.006
3	0.001	0.002	0.003	0.003	0.005	0.005	0.006
4	0.006	0.004	0.004	0.004	0.004	0.005	0.006
5	-0.001	0.003	0.002	0.003	0.004	0.004	0.005
6	-0.003	-0.002	0.002	0.001	0.002	0.002	0.002
7	-0.001	-0.003	-0.002	-0.000	-0.000	0.000	0.001
8	-0.003	-0.001	-0.002	-0.002	0.001	0.001	0.002

PM2.5

Table 7: linear term p-value with lag and moving average data

	p.pv	mv2	mv3	mv4	mv5	mv6	mv7
1	0.000	0.034	0.856	0.207	0.676	0.531	0.346
2	0.075	0.281	0.624	0.278	0.563	0.900	0.756
3	0.000	0.071	0.002	0.016	0.345	0.017	0.108
4	0.609	0.000	0.061	0.002	0.015	0.312	0.018
5	0.855	0.813	0.011	0.185	0.013	0.055	0.554
6	0.171	0.752	0.889	0.024	0.163	0.011	0.028
7	0.437	0.301	0.647	0.809	0.156	0.464	0.057
8	0.973	0.375	0.161	0.337	0.607	0.209	0.423

row:lag days,col:moving average for the n days

Table 8: Parametric coefficients with lag and moving average data

	beta	mv2	mv3	mv4	mv5	mv6	mv7
1	0.009	0.006	-0.001	0.005	0.002	0.003	0.005
2	-0.004	0.003	0.002	-0.004	0.002	-0.001	0.002
3	0.011	0.005	0.011	0.009	0.004	0.011	0.008
4	0.001	0.010	0.006	0.012	0.010	0.005	0.012
5	0.000	0.001	0.009	0.005	0.011	0.009	0.003
6	-0.003	-0.001	0.000	0.009	0.006	0.012	0.011
7	-0.002	-0.003	-0.002	-0.001	0.006	0.004	0.010
8	0.000	-0.003	-0.005	-0.004	-0.002	0.006	0.004

PM10

Table 9: linear term p-value with lag and moving average data

	p.pv	mv2	mv3	mv4	mv5	mv6	mv7
1	0.000	0.097	0.347	0.752	0.775	0.810	0.399
2	0.258	0.060	0.378	0.332	0.672	0.858	0.611
3	0.000	0.042	0.000	0.009	0.339	0.024	0.094
4	0.662	0.009	0.130	0.003	0.031	0.576	0.091
5	0.296	0.230	0.261	0.660	0.058	0.215	0.888
6	0.102	0.307	0.392	0.248	0.533	0.051	0.152
7	0.016	0.016	0.043	0.047	0.686	0.359	0.729
8	0.860	0.068	0.024	0.046	0.087	0.993	0.825

row:lag days,col:moving average for the n days

Table 10: Parametric coefficients with lag and moving average data

	beta	mv2	mv3	mv4	mv5	mv6	mv7
1	0.005	0.003	-0.002	0.001	-0.001	0.001	0.002
2	-0.002	0.003	0.002	-0.002	0.001	-0.000	0.001
3	0.006	0.004	0.007	0.006	0.002	0.006	0.005
4	-0.001	0.004	0.003	0.007	0.005	0.002	0.005
5	-0.002	-0.002	0.002	0.001	0.004	0.003	-0.000
6	-0.002	-0.002	-0.002	0.003	0.002	0.005	0.004
7	-0.004	-0.004	-0.004	-0.004	-0.001	-0.002	0.001
8	-0.000	-0.003	-0.005	-0.004	-0.004	0.000	-0.001

NO

Table 11: linear term p-value with lag and moving average data

	p.pv	mv2	mv3	mv4	mv5	mv6	mv7
1	0.488	0.040	0.084	0.480	0.476	0.521	0.894
2	0.020	0.317	0.858	0.911	0.605	0.781	0.663
3	0.323	0.021	0.175	0.809	0.904	0.523	0.839
4	0.319	0.424	0.087	0.291	0.800	0.879	0.578
5	0.386	0.868	0.821	0.267	0.462	0.888	0.978
6	0.457	0.535	0.980	0.898	0.376	0.660	0.838
7	0.212	0.672	0.388	0.880	0.812	0.351	0.502
8	0.339	0.420	0.217	0.626	0.402	0.291	0.099

row:lag days,col:moving average for the n days

Table 12: Parametric coefficients with lag and moving average data

	beta	mv2	mv3	mv4	mv5	mv6	mv7
1	0.009	0.033	0.032	0.015	0.016	0.016	0.004
2	-0.033	-0.017	0.003	0.002	-0.012	-0.007	-0.011
3	-0.013	-0.039	-0.026	-0.005	-0.003	-0.016	-0.005
4	-0.014	-0.013	-0.033	-0.022	-0.006	-0.004	-0.015
5	0.011	-0.003	-0.004	-0.023	-0.017	-0.004	-0.001
6	-0.010	0.010	0.000	-0.003	-0.020	-0.011	0.005
7	0.017	0.007	0.017	0.003	-0.005	-0.023	-0.018
8	-0.013	-0.013	-0.024	-0.010	-0.019	-0.026	-0.043

NO2

Table 13: linear term p-value with lag and moving average data

	p.pv	mv2	mv3	mv4	mv5	mv6	mv7
1	0.002	0.101	0.944	0.689	0.831	0.738	0.710
2	0.008	0.701	0.914	0.391	0.962	0.737	0.722
3	0.115	0.422	0.345	0.456	0.922	0.575	0.603
4	0.136	0.645	0.440	0.549	0.707	0.679	0.844
5	0.658	0.333	0.819	0.430	0.742	0.974	0.523
6	0.962	0.275	0.855	0.364	0.951	0.346	0.441
7	0.469	0.681	0.883	0.447	0.788	0.264	0.777
8	0.431	0.384	0.334	0.746	0.396	0.769	0.378

row:lag days,col:moving average for the n days

Table 14: Parametric coefficients with lag and moving average data

	beta	mv2	mv3	mv4	mv5	mv6	mv7
1	0.017	0.011	-0.000	0.003	-0.002	-0.003	-0.004
2	-0.014	0.002	0.001	-0.007	-0.000	-0.003	-0.003
3	0.008	-0.005	0.007	0.006	-0.001	0.005	0.005
4	-0.008	0.003	-0.005	0.005	0.003	-0.004	0.002
5	0.002	-0.006	0.002	-0.006	0.003	0.000	-0.006
6	-0.000	0.007	0.001	0.007	-0.000	0.009	0.007
7	-0.004	-0.003	0.001	-0.006	-0.002	-0.010	-0.003
8	0.004	-0.006	-0.007	-0.003	-0.007	-0.003	-0.008