

Regionalization of PM_{2.5} in Jing-Jin-Ji Area Using Convex Clustering

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Abstract: For air-pollution control, it is important to specify regions with similar emission patterns so that more precise local policies can be made accordingly. In this study, we treat PM_{2.5} concentrations from monitoring stations and/or computer model grid cells as spatially-dependent functional data. Geographical information of station/grid locations is used to define a graph, and we develop a modified convex clustering method to group these locations. In numerical studies, we find that the conventional ADMM is fast enough to deal with large spatiotemporal datasets. The proposed method is applied to regionalize PM_{2.5} concentrations in Jing-Jin-Ji, one of the most polluted area in China. Results show that there are three different emission patterns in this area with clear boundaries.