Hilbert curves for data thinning and application to aircraft data

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Abstract

The space-filling Hilbert curve associates points on a parameterized interval (the Hilbert parameter) with points in a spatial domain of higher dimensions in a continuous way. Point observations scattered in space can be mapped, and serially sorted, onto the Hilbert parameter efficiently. When the data density is high on the Hilbert curve, it is necessarily high in space. This suggests that when there is a need to thin data, such as aircraft observations, which are very dense in compact locations (airports) distributed sporadically, we can perform this thinning relatively easily on the Hilbert curve with the assurance that the effects of this thinning will be reflected in physical space. We shall discuss our experience using this method, and will discuss the impacts with application of hilbert curve method to aircraft data.

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