Reliable estimations of a function and its derivatives. Application to certified positioning of trains, vehicles or drones

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Various models and algorithms that enable to provide accurate and certified tubular neighborhoods for a class of functions f: $\mathbf{R} \to \mathbf{R}^n$ and its derivatives derived from data and certified intervals that contains f at some discrete points from **R** are presented. Produced for the needs of Alstom and the RATP, they can be used to obtain in real time reliable estimations of the positions, speeds or accelerations of vehicles like trains, cars or drones.