

Approximating Maximum Speed on Road from Curvature Information of Bezier Curve

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Abstract : Bezier curves have useful properties for path generation problem, for instance, it can generate the reference trajectory for vehicles to satisfy the path constraints. Both algorithms join cubic Bezier curve segment smoothly to generate the path. Some of the useful properties of Bezier are curvature. In mathematics, the curvature is the amount by which a geometric object deviates from being flat, or straight in the case of a line. Another extrinsic example of curvature is a circle, where the curvature is equal to the reciprocal of its radius at any point on the circle. The smaller the radius, the higher the curvature thus the vehicle needs to bend sharply. In this study, we use Bezier curve to fit highway-like curve. We use the different approach to finding the best approximation for the curve so that it will resemble highway-like curve. We compute curvature value by analytical differentiation of the Bezier Curve. We will then compute the maximum speed for driving using the curvature information obtained. Our research works on some assumptions; first the Bezier curve estimates the real shape of the curve which can be verified visually. Even, though, the fitting process of Bezier curve does not interpolate exactly on the curve of interest, we believe that the estimation of speed is acceptable. We verified our result with the manual calculation of the curvature from the map.

Keywords : speed estimation, path constraints, reference trajectory, Bezier curve

Conference Title : ICMCS 2015 : International Conference on Mathematics and Computational Science

Conference Location : Bangkok, Thailand

Conference Dates : December 17-18, 2015