Abstract

This paper explores the possibilities of very simple analysis on derivation of spiral regions for a single segment of cubic function matching positional, tangential, and curvature end conditions. Spirals are curves of monotone curvature with constant sign and have the potential advantage that the minimum and maximum curvature exists at their end points. Therefore, spirals are free from singularities, inflection points, and local curvature extrema. These properties make the study of spiral segments an interesting problem both in practical and aesthetic applications, like highway or railway designing or the path planning of non-holonomic mobile robots. Our main contribution is to simplify the procedure of existence methods while keeping it stable and providing flexile constraints for easy applications of spiral segments.