

influence on the final excursion, we introduced some assumptions which is linearization and direct accumulation for the purpose of parametric design and computer programming. Despite such simplifications and approximations, the result of simulation verifies the rationality of these simplification and approximations while the result of theory is a little lower than that of simulation. Furthermore, it is worth mention that the shorter the clothoid spiral length is, the larger the error between theory and simulation is.

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NOMENCLATURE

l	arc length of clothoid spiral
O_1	start point of the spiral point
d_l	differential arc
d_x	differential arc on X axis
d_y	differential arc on Y axis
R_0	radius of clothoid spiral
L_s	total clothoid spiral length
k_{12}	slope of line across point 1 and 2
d	distance from both sides of wheel edges
B_1	width of rail

Greek symbols

ρ	curvature radius
β	central angle (helix angle)
δ	deviation value