



ON GENERALIZED EULER SPIRALS IN E^3

SEMRA S. ÇELİK, YUSUF YAYLI and ERHAN GÜLER

Abstract. The Cornu spirals on plane are the curves whose curvatures are linear. Generalized planar cornu spirals and Euler spirals in E^3 , the curves whose curvatures are linear are defined in [1,5]. In this study, these curves are presented as the ratio of two rational linear functions.

Also here, generalized Euler spirals in E^3 has been defined and given their some various characterizations. The approach we used in this paper is useful in understanding the role of Euler spirals in E^3 in differential geometry.

1. INTRODUCTION

Spirals are the curves that had been introduced in the 1700s. Privately, one of the most fascinating spiral in nature and science is Euler Spiral. This curve is defined by the main property that its curvature is equal to its arclength.

Euler Spirals were discovered independently by three researchers [5, 9]. In 1694, Bernoulli wrote the equations for the Euler spiral for the first time, but did not draw the spirals or compute them numerically. In 1744, Euler rediscovered the curve's equations, described their properties, and derived a series expansion to the curve's integrals. Later, in 1781, he also computed the spiral's end points. The curves were re-discovered in 1890 for the third time by Talbot, who used them to design railway tracks [5].

On the other hand, the Euler spiral, defined by the linear relationship between curvature and arclength, was first proposed as a problem of elasticity of James Bernoulli, then solved accurately by Leonhard Euler [9]. The Euler spiral, also well known as Clothoid or Cornu Spiral is a plane curve and defined as the curve in which the curvature increases linearly with arclength. Changing the constant of proportionality merely scales the entire curve [9,11]. This curve is known as an example of such an aesthetic curve and also we know that its curvature varies linearly with arclength [2,5,7, 9]. In [5], their proposed curve has both its curvature and torsion change linearly with length.

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