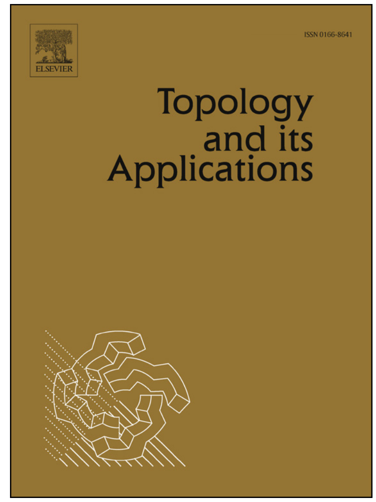
Accepted Manuscript



On vertices and evolute of orthogonal projection of space curves

Mostafa Salarinoghabi

PII: S0166-8641(17)30618-1
DOI: https://doi.org/10.1016/j.topol.2017.11.026
Reference: TOPOL 6328

To appear in: *Topology and its Applications*

Received date: 24 January 2017
Revised date: 6 June 2017
Accepted date: 17 July 2017

Please cite this article in press as: M. Salarinoghabi, On vertices and evolute of orthogonal projection of space curves, *Topol. Appl.* (2017), https://doi.org/10.1016/j.topol.2017.11.026

On vertices and evolute of orthogonal projection of space curves

Mostafa Salarinoghabi

Instituto de Ciências Exatas,Universidade Federal de Itajubá, Avenida BPS 1303, Itajubá, MG, Brazil.

Abstract

We consider in this paper the orthogonal projection of space curves. A vertex is a point on the projected plane curve where there exists a circle which has at least 4-point contact with the curve. The contact of projected plane curve with circles gives information about contact of space curve with circular cylinders.

Keywords: Orthogonal projection, evolute, plane curve, vertex, contact.
2010 MSC: 53A04, 57R45, 58K40, 14H50.

1. Introduction

Orthogonal projection of space curve γ along unit direction w is well studied. If w is tangent to γ at t, then the projected plane curve $\alpha_w(t)$ is singular and if w is not tangent to γ at t, then $\alpha_w(t)$ is regular at t. Geometric information on the projected curve provides geometric information about the space curve itself .

A study of families of projections of space curves is carried out in [1], [2] and [3]. The way the singularities and the inflections of the projected curve bifurcate when the direction of projection varies locally in the unit sphere is given. The bifurcations in the dual of the projected curve are also determined in [1].

In [4] is proposed a way to study the deformations of plane curves by considering the deformations of the singularity and keeping information about the appearance of infections and vertices. When the plane curve is singular (resp. regular) the authors of [4] named their method by FRS (resp. FR).

More precisely, consider two germs of m-parameter deformations of the same plane curve: $\gamma_s, s \in (\mathbb{R}^m_1, 0)$, and $\eta_u, u \in (\mathbb{R}^m_2, 0)$, (note that here the authors of [4] use the notation $\mathbb{R}^m_i$ instead of $\mathbb{R}^m$ to point out which family are considered). Equip the base $(\mathbb{R}^m_1, 0)$ with a stratification $(S_1, 0)$ such that if s' and s'' are in the same stratum then the curves $\gamma_{s'}$ and $\gamma_{s''}$ satisfy the following properties:

Email address: mostafa@unifei.edu.br (Mostafa Salarinoghabi)