Bektaş, Özcan; Bekiryazici, Zafer

Generalized osculating curves of type \((n - 3)\) in the \(n\)-dimensional Euclidean space. (English) Zbl 07545451

Summary: In this paper, we give a generalization of the osculating curves to the \(n\)-dimensional Euclidean space. Based on the definition of an osculating curve in the 3 and 4 dimensional Euclidean spaces, a new type of osculating curve has been defined such that the curve is independent of the \((n - 3)\)th binormal vector in the \(n\)-dimensional Euclidean space, which has been called “a generalized osculating curve of type \((n - 3)\).” We find the relationship between the curvatures for any unit speed curve to be congruent to this osculating curve in \(E^n\). In particular, we characterize the osculating curves in \(E^n\) in terms of their curvature functions. Finally, we show that the ratio of the \((n - 1)\)th and \((n - 2)\)th curvatures of the osculating curve is the solution of an \((n - 2)\)th order linear nonhomogeneous differential equation.

MSC:
53A04 Curves in Euclidean and related spaces
53A07 Higher-dimensional and \(-\)codimensional surfaces in Euclidean and related \(n\)-spaces
34A05 Explicit solutions, first integrals of ordinary differential equations

Keywords: osculating curve; curvatures; unit speed curve; higher order linear differential equation

Full Text: DOI

References:
[7] Ilarslan, K., Spacelike normal curves in Minkowski space, Turkish Journal of Mathematics \(\langle E^3_1 \rangle, 29(1) (2005), 53-63 \rangle.


34. Ilarslan, K., Spacelike normal curves in Minkowski space, Turkish Journal of Mathematics \( |E^3_1 \), 29(1) (2005), 53-63. · Zbl 1099.53024

35. Ilarslan, K., Nesovic, E., Timelike and null normal curves in Minkowski space \( (E^3_1 \), Indian Journal of Pure & Applied Mathematics, 35(7) (2004), 881-888. · Zbl 1061.53012


45. Ilarslan, K., Nesovic, E., The first kind and the second kind osculating curves in Minkowski space-time, Comptes rendus de l’Academie bulgare des Sciences, 62(6) (2009), 677-686. · Zbl 1199.53136

Edited by FIZ Karlsruhe, the European Mathematical Society and the Heidelberg Academy of Sciences and Humanities © 2022 FIZ Karlsruhe GmbH


This reference list is based on information provided by the publisher or from digital mathematics libraries. Its items are heuristically matched to zbMATH identifiers and may contain data conversion errors. It attempts to reflect the references listed in the original paper as accurately as possible without claiming the completeness or perfect precision of the matching.