The total curvature of knots under second-order infinitesimal bending

Marija S. Najdanović[*,§], Svetozar R. Rančić[†,¶],
Louis H. Kauffman[‡,‖] and Ljubica S. Velimirović[†,**]

*Faculty of Natural Sciences and Mathematics,
University of Priština, Kosovska Mitrovica, Serbia*

†*Faculty of Science and Mathematics,
University of Niš, Niš, Serbia*

‡*Department of Mathematics, Statistics and Computer Science,
851 South Morgan Street, University of Illinois at Chicago,
Chicago, Illinois 60607-7045, USA*

*Department of Mechanics and Mathematics,
Novosibirsk State University, Novosibirsk, Russia*
§*marijamath@yahoo.com*
¶*rancicsv@yahoo.com*
‖*kauffman@uic.edu*
****vljubica@pmf.ni.ac.rs*

ABSTRACT

In this paper, we consider infinitesimal bending of the second-order of curves and knots. The total curvature of the knot during the second-order infinitesimal bending is discussed and expressions for the first and the second variation of the total curvature are given. Some examples aimed to illustrate infinitesimal bending of knots are shown using figures. Colors are used to illustrate curvature values at different points of bent knots and the total curvature is numerically calculated.

Keywords: Second-order infinitesimal bending; first variation; second variation; total curvature; curve; knot.

Mathematics Subject Classification 2010: 53A04, 53C45, 57M25, 57M27, 78A25