On transforming a spatial graph into a plane graph

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Abstract

This talk is an improved revision of the talk (see [1]) given at the workskp Knots and soft-matter physics, Kyoto, August, 2008 on a complexity of a spatial graph with an emphasis on a transformation of spatial graph into a plane graph. In a research of proteins, molecules, or polymers, it is important to understand geometrically and topologically spatial graphs possibly with degree one vertices including knotted arcs. For every spatial graph without degree one vertices, we introduce the *complexity* and related topological invariants, called the *warping degree*, the γ-*warping degree*, and the (γ, Γ)-*warping degree* by revising the similar invariants in [1].
The concept of complexity explains a path from any given spatial graph to a plane graph. Similarly, the *unknotting number* and related concepts γ-*unknotting number,* Γ-*unknotting number*, (γ, Γ)-*unknotting number* (generalizing the usual unknotting number of a knot) are explained. These invariants are used to define semi-topological invariants for a spatial graph with degree one vertices, meaningful even for a knotted arc.

References

[1] A. Kawauchi, On a complexity of a spatial graph. in: Knots and soft-matter physics, Topology of polymers and related topics in physics, mathematics and biology, Bussei Kenkyu 92-1 (2009-4), 16-19.