



Visualization of Seifert surfaces

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Abstract. The genus of a knot or link can be defined via Seifert surfaces. A Seifert surface of a knot or link is an oriented surface whose boundary coincides with that knot or link. Schematic images of these surfaces are shown in every text book on knot theory, but from these it is hard to understand their shape and structure. In this article the visualization of such surfaces is discussed. A method is presented to produce different styles of surface for knots and links, starting from the so-called braid representation. Application of Seifert's algorithm leads to depictions that show the structure of the knot and the surface, while successive relaxation via a physically based model gives shapes that are natural and resemble the familiar representations of knots. Also, we present how to generate closed oriented surfaces in which the knot is embedded, such that the knot subdivides the surface into two parts. These closed surfaces provide a direct visualization of the genus of a knot. All methods have been integrated in a freely available tool, called SeifertView, which can be used for educational and presentation purposes.