



# An algorithm for computing the Seifert matrix of a link from a braid representation

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**Abstract.** A Seifert surface of a knot or link in  $S^3$  is an oriented surface in  $S^3$  whose boundary coincides with that of the link. A corresponding Seifert matrix has as its entries the linking numbers of a set of homology generators of the surface. Thus a Seifert matrix encodes essential information about the structure of a link and, unsurprisingly, can be used to define powerful invariants, such as the Alexander polynomial. The program SeifertView has been designed to visualise Seifert surfaces given by braid representations, but it does not give the user any technical information about the knot or link. This article describes an algorithm which could work alongside SeifertView and compute a Seifert matrix from the same braids and surfaces. It also calculates the genus of the surface, the Alexander polynomial of the knot and the signature of the knot.