VIRTUAL SPATIAL GRAPH THEORY

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(Joint work with Blake Mellor)

Two popular generalizations of knot theory are spatial graph theory and virtual knot theory. We propose a unification of these two approaches: virtual spatial graph theory. In this theory we will study diagrams of arbitrary graphs in the plane up to some equivalence relations (virtual Reidemeister moves), where we allow the diagrams to have both classical and virtual crossings.

We will begin by introducing virtual spatial graphs, Gauss codes for graphs, and discuss when a Gauss code is realizable. We will also introduce generalizations of several invariants of spatial graphs and virtual knots to this new context, such as the Yamada polynomial and the quandle. Finally, we will discuss an application of virtual spatial graph theory to the study of intrinsically linked and knotted graphs.

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