Virtual Knots & Zero Crossing Weights

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Making a Virtual Trefoil Knot
Gauss Code: O1+U2+U1+O2+

Crossing Weights
From the Gauss Codes, we get the weight of a crossing and the Crossing Weight Number.

Crossing Weight Number is an invariant on virtual knots.
All classical knots have crossing weights of zero. Certain non-classical knots do as well.

Motivation
Investigating non-classical knots that have all crossings weight zero.

Goal: To find a set of moves such that any virtual knot with all crossings weight zero is related to a classical knot by these moves.

Virtualization Moves
Allows us to make virtual knots out of classical knots. Crossings must be contra-oriented.

Way Virtualization

Sign Virtualization

Conclusion: These moves do NOT preserve crossing weights, but helps find moves that do.

Double Virtualization Moves
Double virtualization moves are the virtualization moves performed twice on adjacent crossings. Crossings must be contra-oriented.

Double Way Virtualization

Double Sign Virtualization

Triangle Virtualization!
A move observed that uses three combinations of single way and/or single sign virtualization. Crossings must be circular-oriented.

Example: Two sign virtualizations and one way virtualization.

Conclusion: Crossing weights of a knot are NOT changed after performing either of these moves.

Conclusion: Crossing weights of a knot are NOT changed after performing triangle virtualization.