

# Research proposal

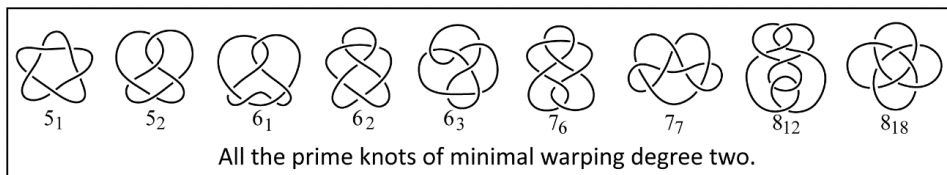
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## Studies on knot diagrams

I will refine the studies on warping degree, warping polynomial and warping matrix to derive effective knot invariants from them. I would also like to solve an open problem about the reductivity.

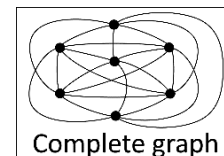
## Alternating warping degree

I will update studies on the minimal warping degree and alternating warping degree, considering the independent region sets. I will also clarify the relation between independent region set and region crossing change to accelerate the studies. I am also attempting to apply minimal warping degree to other fields, such as soft matter physics or biology, by measuring a sort of softness of knots.



## Crossing number of complete graphs

By applying research results on knot diagrams, I will study spatial graphs and solve an open problem regarding the crossing number of complete graphs.



## Region crossing change and its applications

I will clarify the relation between region unknotting number and other knot invariants, in particular the crossing number. By exploring various versions of region crossing change, I would like to organize the perspective of knot or link diagrams. Finally, I will apply the results to solve open problems on the 4-move.