Plans of my research

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I have classified spatial graphs up to ambient isotopy, and believe that my work is the latest frontiers of θ-curve and handcuff graph tables. Recently, M. Chiodo, D. Heard, C. Hodgson, J. Saunderson and N. Sheridan also make a table of knotted trivalent graphs in similar way to mine. They classify the graphs by using the computer program `Orb` due to Heard, which gives a invariant concerned with their hyperbolic structures. Moreover, they enumerate "θ-polyhedra" by using the computer program `plantri` due to G. Brinkmann and B. McKay. I think that we can easily make a table of spatial trivalent graphs with more than seven crossings through `Orb` and `plantri`. In Fact, `plantri` says, there exist 38 planar 3-connected graphs which have 2 trivalent vertices and 8 4-valent vertices. I must check these graphs are all "θ-polyhedra" or not.

For θ-curves and handcuff graphs with up to seven crossings, the Yamada polynomial is very useful to classify them. However, I do not know how powerful the Yamada polynomial for θ-curves and handcuff graphs with more than seven crossings or complete graphs on four vertices. I would like to research this question. Moreover, I try to develop a new invariant which can classify those 3-valent spatial graphs.

I would like to investigate how spatial graphs are classified in other equivalence. Particularly, I am interested in neighbourhood congruence. On account, I try to classify the spatial graphs in my tables. However, we need an invariant for neighbourhood congruence.

Finally, I would like to study about the achirality of spatial graphs. Since there are only three achiral handcuff graphs (and no achiral θ-curves) in my tables, it seems special property. In fact, the achirality is concerned with high polymer chemistry and molecular biology.