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The Cayley Isomorphism Problem

Finding alternate representations of a fixed graph as a Cayley graph can be useful in determining embeddings of the graph onto surfaces, amongst other applications.

It is easy to see that if α is an automorphism of the group G, then the Cayley graph $\mathrm{Cay}(G;S)$ is isomorphic to the Cayley graph $\mathrm{Cay}\big(G;\alpha(S)\big)$.

A group G has the CI-property if this is the only way to obtain two Cayley graphs on G that are isomorphic. More precisely, G has the CI-property if whenever $\mathrm{Cay}(G;S)$ is isomorphic to $\mathrm{Cay}(G;T)$, there is a group automorphism β of G, such that $\beta(S)=T$. The CI-problem is the problem of determining which groups have the CI-property.

I will present an overview of the CI-problem, including some recent developments and open problems.