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Links between Seifert surfaces and finite type invariants of 3-manifolds

In [math.GT/0703347], I proved some surgery formulae for finite type invariants of homology 3-spheres. These surgery formulae that involve link Seifert surfaces specify the relationships discovered by many mathematicians—including Ohtsuki, Goussarov, Habiro, Garoufalidis and Polyak—between various filtrations of the rational vector space freely generated by homology 3-spheres.

I wish to explain how these surgery formulae can be easily guessed from the Kontsevich–Kuperberg–Thurston definition of a universal finite type invariant for homology 3-spheres in terms of configuration space integrals. I shall begin the talk with the simplest case of the degree one Casson invariant.