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Dehn functions, the word problem, hydra, and magical salmon

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Abstract:
The word problem for a finitely presented group asks for an algorithm which, on input a word on the generators, declares whether or not that word represents the identity. The Dehn function counts how many times you have to call on the defining relators when using them to derive the fact that a given word represents the identity.

It might seem then, that the Dehn function should be a reasonable measure of the computational complexity of the word problem. This turns out to be far from the case. I will survey some examples and will discuss this disconnect.