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Florian Frick* (frick@cmu.edu) and **Matt Superdock**. *Bounding coindices of function spaces via motion planning.*

I will explain a relaxed notion of motion planning algorithm that under certain conditions instead of contractibility of a space yields a lower bound for the $\mathbb{Z}/2$ -coindex of the space. This arose naturally while trying to show the existence of smooth complex-valued functions with certain properties: Lazarev and Lieb showed that finitely many integrable functions from the unit interval to complex numbers can be simultaneously annihilated in the L^2 inner product by a smooth function to the unit circle. Here we answer a question of Lazarev and Lieb proving a generalization of their result by lower bounding the equivariant topology of the space of smooth circle-valued functions with a certain $W^{1,1}$ -norm bound. (Received September 04, 2019)