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Gunnar Erik Carlsson* (gunnar@gunnarcarlsson.com), Department of Mathematics, Serra Street, Stanford, CA 94305. *Parametrized homotopy theory and motion planning problems.*

There are many problems in engineering that involve situations where one is given the topology of a region and is required to navigate the complement of this region. This comes up in robotics, sensor net technology, and other situations. It is interesting to consider problems where the set varies with time. Alexander duality is a natural tool to use for problems of this type, but it is not sufficient in many situations. We will survey topological results on these problems, and discuss some new directions involving techniques beyond homology. (Received September 14, 2019)