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Monotone homotopies and sweepouts

A monotone homotopy or sweepout is one which passes through each point at most once. I will describe how to turn homotopies and sweepouts into ones that are monotone, while preserving their geometric properties. These methods have a number of interesting applications, including to metric geometry and to the existence of minimal hypersurfaces. This talk involves work in collaboration with Yevgeny Liokumovich, Regina Rotman, Arnaud de Mesmay, Tim Ophelders, and Erin Chambers.