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Dan Kalman* (kalman@american.edu). *Optimization as a Proof Technique.*

The usual goal of optimization is to answer a question about possible extreme cases for a phenomenon or context. But sometimes optimization provides a means for proving theorems. As a simple example, to prove the validity of an inequality of the form $f(x, y, \dots) \geq 0$ in a domain Ω , it suffices to minimize f over Ω and show that the minimum value is nonnegative. In this talk we will consider several examples where optimization elegantly proves results that do not at first glance appear to have anything to do with optimization. In some of these examples the objective function is very simple so that the key feature of the optimization concerns the geometry of the domain of optimization. (Received August 30, 2020)