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The soda can optimization problem: getting close to the real thing.

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Summary: Optimizing the dimensions of a soda can is a classic problem that is frequently posed to freshman calculus students. However, if we only minimize the surface area subject to a fixed volume, the result is a can with a square edge-on profile, and this differs significantly from actual cans. By considering a more realistic model for the can that consists of six components, including varying wall thickness, and minimizing the total metal volume, we arrive at an optimal can that has dimensions more in-line with actual manufactured cans. This model indicates an optimal radius of 2.83 cm and an overall height of 15.2 cm, which is closer to the dimensions of real cans today than what is obtained from assuming the can is a right circular cylinder. The calculations involved would serve as a useful undergraduate modelling project.

Classification: I45 N65 M15

Keywords: optimization; calculus; modeling

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