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NJ. *Study on the Calculus of Variations and Mean Boundary Proof for Isoperimetric Problems.*

Isoperimetric Theorem has been known as a fascinating topic, and the most essential contribution to the topic has been provided by Jacob Steiner. Also, as for the mathematics of the isoperimetric problem, a mathematician Zenodorus (200 B.C.-140 B.C.) studied the area of a figure with fixed diameter, proving that a circle has greater area than any polygon with the same perimeter. Variational method explained that a regular n-gon has greater area than all other n-gons with the same perimeter.

Steiner's mean boundary proof shows that the difference between the smallest and the largest diameter decreases, for by the process, when the new axis is chosen, the largest diameter will be made smaller and the smallest will be made larger. By choosing the appropriate new axes, the diameters can be brought closer to equality faster.

This paper shows that the solution of this isoperimetric problem by means of calculus of variations can be useful for the proof using computational analysis compared to using classical method. (Received August 29, 2018)