



The Five-Gold-Button Math Competition

Problem 2010-04

Let \mathcal{F} be a finite set of real-valued linear functionals on \mathbb{R}^n . Consider the min function

$$\mu(x) = \min\{f(x) \mid f \in \mathcal{F}\}.$$

Suppose $\{x \in \mathbb{R}^n \mid \mu(x) > 0\} \neq \emptyset$. Show that the function μ restricted to the unit sphere $\|x\| = 1$ attains a relative maximum at a unique point.

Sponsored by Department of Mathematics
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Correspondence: five-gold@postech.ac.kr

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