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**Inequalities for Polynomials on the Unit Square via the Krein-Milman Theorem**

We provide sharp Bernstein and Markov inequalities for 2-homogeneous polynomials on the square  $\square \subset \mathbb{R}^2$  with vertices  $(0, 0)$ ,  $(1, 0)$ ,  $(1, 1)$  and  $(0, 1)$ . If  $\mathcal{P}(\square)$  is the space of such polynomials, we also find the polarization constant of  $\mathcal{P}(\square)$  and the unconditional constant for the canonical basis of  $\mathcal{P}(\square)$ . All the results are obtained by means of the Krein-Milman Theorem, using a characterization of the extreme 2-homogeneous polynomials on  $\square$  which is also given in the paper.

**Keywords:** Convexity, extreme points, polynomial norms, Bernstein and Markov inequalities, polarization constants.

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