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Title: Generalization and improvements of numerical radius inequalities

Abstract: Let $\mathcal{B}(\mathcal{H})$ denote the C^*-algebra of all bounded linear operators on a complex Hilbert space $\mathcal{H}$. For $A \in \mathcal{B}(\mathcal{H})$, let $w(A)$ and $\|A\|$ denote the numerical radius and the usual operator norm of A, respectively. It is well known that

$$\frac{1}{2}\|A\| \leq w(A) \leq \|A\|.$$

An improvement of the above inequality has been given by Kittaneh in 2005. It says that for $A \in \mathcal{B}(\mathcal{H})$,

$$\frac{1}{4}\|A^*A + AA^*\| \leq w^2(A) \leq \frac{1}{2}\|A^*A + AA^*\|.$$

In this talk, after reviewing recent results containing such inequalities, by using the properties of convex functions, we improve under a certain condition and generalize these inequalities.

Our trial to obtain improvements for the previous results depend on our tools of mathematical inequalities so that such an application to numerical radius inequalities is a new approach. Thus we hope to be useful for researchers in the field. Meanwhile we study this topic with geometrically convex functions, we obtained interesting scalar inequalities as a by-product.

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