1116-30-1032 **Javad Mashreghi*** (javad.mashreghi@mat.ulaval.ca), Department of Mathematics and Statistics, Laval University, Quebec, QC G1V 0A6, Canada. *An application of finite Blaschke products in operator theory.*

Let T be an operator on a Hilbert space H with numerical radius $w(T) \leq 1$. According to a theorem of Berger and Stampfli, if f is a function in the disk algebra such that $f(0) = 0$, then $w(f(T)) \leq \|f\|_\infty$. We give a new and elementary proof of this result using finite Blaschke products.

A well-known result relating numerical radius and norm says $\|T\| \leq 2w(T)$. We obtain a local improvement of this estimate, namely, if $w(T) \leq 1$ then

$$\|Tx\|^2 \leq 2 + 2\sqrt{1 - |\langle Tx, x\rangle|^2} \qquad (x \in H,\ \|x\| \leq 1).$$

Using this refinement, we give a simplified proof of Drury's teardrop theorem, which extends the Berger–Stampfli theorem to the case $f(0) \neq 0$.

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