

ANOTHER IDENTITY RELATING TO HARDY'S INEQUALITY FOR ℓ_2

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Abstract. Let C denote the Cesàro operator on ℓ_2 , I the identity and $\|x\|$ the ℓ_2 -norm of x . Complementing an earlier result, an exact expression is derived for $\|(C-I)x\|^2$. Implications include the inequalities $\frac{1}{\sqrt{2}}\|x\| \leq \|(C-I)x\| \leq \|x\|$ and $\|(C-I)x\| \geq \|C^T - I\|x\|$.

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REFERENCES

- [1] A. BROWN, P. R. HALMOS AND A. L. SHIELDS, *Cesàro operators*, Acta Sci. Math. **26** (1965), 125–137.
- [2] G. J. O. JAMESON, *An equality underlying Hardy's inequality*, American Math. Monthly **129** (2022), 582–586.