



الجمهورية الجزائرية الديمقراطية الشعبية

Popular and Democratic Algerian Republic

وزارة التعليم العالي و البحث العلمي

Ministry of High Education and Scientific Research

جامعة الشهيد حمّـة لخضر – الوادي

University Of El Oued



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Proposal for a PhD Thesis in Mathematics "Mauritania"

Title: **DEFINITION OF A NEW NORM TO REFINE INEQUALITIES BETWEEN THE NORM OF AN OPERATOR AND THE NUMERICAL RADIUS**

Keywords: Operator Norm, Numerical Radius, Functional Inequalities.

Problem Statement: This thesis falls within the framework of the theory of linear operators on a Hilbert space. To clearly define its specific characteristics, a historical overview of the development of functional analysis is helpful.

In this work, we aim to refine some inequalities between operator norms and operator digital images. More specifically, we want to define a new norm that satisfies all the conditions and significantly improves upon the existing inequalities between operator norms and operator numerical radii.

Admittedly, it's not easy, but we may even achieve some interesting results.

Main topics:

The bounded linear operator space $B(H)$.

Operator norms, equivalent norms.

Definition of a new norm.

Numerical range, Numerical radius.

Inequalities.



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References:

- [1] N. Dunford, J. Schwartz, Linear Operators, vols. 1, 2, and 3, Interscience, New York, 1964.
 - [2] P.R. Halmos, A Hilbert Space Problem Book, Springer Verlag, 1982.
 - [3] F. Kittaneh, Numerical radius inequalities for Hilbert space operators, Studia Math., 168(1)(2005), 73-80.
 - [4] F. Kittaneh, Norm inequalities for sums and differences of positive operators, Linear Algebra Appl., 383(2004), 85-91.
 - [5] M. Lin and D. Zhou, Norm inequalities for accretive-dissipative operator matrices, J. Math. Anal. Appl., 407 (2013), 436-442.
 - [6] A. Mansour, Solvability of two types of operator equations and interactions, doctoral thesis, University of Lyon 1, France (2016).
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