A CHARACTERIZATION OF THE STABILITY OF A SYSTEM OF THE BANACH SPACE VALUED DIFFERENTIAL EQUATIONS

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Abstract. We will consider the Banach space valued differential equation \( y'(t) = A y(t) \), where \( A \) is an \( n \times n \) complex matrix. We give a necessary and sufficient condition in order that the equation have the Hyers-Ulam stability. As a Corollary, we prove that the Banach space valued linear differential equation with constant coefficients \( y^{(n)}(t) + a_{n-1}y^{(n-1)}(t) + \cdots + a_1 y'(t) + a_0 y(t) = 0 \) has the Hyers-Ulam stability if and only if \( \text{Re} \lambda \neq 0 \) for all the solutions \( \lambda \) of the equation \( \lambda^n + a_{n-1}\lambda^{n-1} + \cdots + a_1 \lambda + a_0 = 0 \).


Keywords and phrases: Exponential functions, Hyers-Ulam stability, Hyers-Ulam-Rassias stability.

REFERENCES