
QIANGLIAN HUANG† AND MOHAMMAD SAL MOSLEHIAN‡

Abstract. In this paper, a link between the Hyers–Ulam stability and the Moore–Penrose inverse is established, that is, a closed operator has the Hyers–Ulam stability if and only if it has a bounded Moore–Penrose inverse. Meanwhile, the stability constant can be determined in terms of the Moore–Penrose inverse. Based on this result, some conditions for the perturbed operators having the Hyers–Ulam stability are obtained, and the Hyers–Ulam stability constant is expressed explicitly in the case of closed operators. In the case of the bounded linear operators, some characterizations for the Hyers–Ulam stability constants to be continuous are derived. As an application, a characterization for the Hyers–Ulam stability constants of the semi-Fredholm operators to be continuous is given.

Key words. Hyers–Ulam stability, Moore–Penrose inverse, Generalized inverse, Reduced minimum modulus, Closed linear operator, T−Boundedness, Semi-Fredholm operator.

AMS subject classifications. 47A55, 46A32, 39B82, 47A05, 47A30.

†College of Mathematics, Yangzhou University, Yangzhou 225002, China; School of Mathematical Sciences, Monash University, VIC 3800, Australia (qhlmath@yahoo.com.cn).
‡Department of Pure Mathematics, Center of Excellence in Analysis on Algebraic Structures (CEAAS), Ferdowsi University of Mashhad, P.O. Box 1159, Mashhad 91775, Iran (moslehian@um.ac.ir, moslehian@member.ams.org, http://profsite.um.ac.ir/~moslehian/).