

# ON THE FIBONACCI FUNCTIONAL EQUATION

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ABSTRACT. First, we find in an exact form the unique solution of the Fibonacci functional equation  $f(x) = f(x - 1) + f(x - 2)$  where  $f : \mathbb{R} \rightarrow X$  and  $X$  is a real vector space. Next we solve the Hyers-Ulam stability problem of the above equation when  $X$  is a real Banach space. Here we prove the uniqueness as well as the existence. Finally we check that the constant in the stability problem is the best possible.

## REFERENCES

- [1] J. BAKER, J. LAWRENCE AND F. ZORZITTO, *The stability of the equation  $f(x+y) = f(x)f(y)$* , Proc. Amer. Math. Soc. **74**(1979), 242-246.
- [2] D. H. HYERS, *On the stability of the linear functional equation*, Proc. Natl. Acad. Sci. USA **27**(1941), 222-224.
- [3] TH. M. RASSIAS, *On the stability of functional equations and a problem of Ulam*, Acta Appl. Math. **62**(2000), 23-130.
- [4] TH. M. RASSIAS, *On the stability of functional equations in Banach spaces*, J. Math. Anal. Appl. **251**(2000), 264-284.