

THE HORADAM HYBRID NUMBERS

ANETTA SZYNAL-LIANA

Rzeszow University of Technology
Faculty of Mathematics and Applied Physics
al. Powstańców Warszawy 12, 35-959 Rzeszów, Poland

e-mail: aszynal@prz.edu.pl

Abstract

In this paper we introduce the Horadam hybrid numbers and give some their properties: Binet formula, character and generating function.

Keywords: Horadam numbers, recurrence relations, complex numbers, hyperbolic numbers, dual numbers.

2010 Mathematics Subject Classification: 11B37, 11B39, 97F50.

REFERENCES

- [1] C.B. Çimen and A. İpek, *On Pell Quaternions and Pell-Lucas Quaternions*, Advances in Applied Clifford Algebras **26** (2016) 39–51.
doi:10.1007/s00006-015-0571-8
- [2] S. Halici, *On Complex Fibonacci Quaternions*, Advances in Applied Clifford Algebras **23** (2013) 105–112.
doi:10.1007/s00006-012-0337-5
- [3] S. Halici, *On Fibonacci Quaternions*, Advances in Applied Clifford Algebras **22** (2012) 321–327.
doi:10.1007/s00006-011-0317-1
- [4] A.F. Horadam, *Basic properties of a certain generalized sequence of numbers*, The Fibonacci Quarterly **3.3** (1965) 161–176.
- [5] A.F. Horadam, *Complex Fibonacci numbers and Fibonacci quaternions*, American Mathematical Monthly **70** (1963) 289–291.
doi:10.2307/2313129
- [6] S.K. Nurkan and İ.A. Gven, *Dual Fibonacci Quaternions*, Advances in Applied Clifford Algebras **25** (2015) 403–414.
doi:10.1007/s00006-014-0488-7

- [7] M. Özdemir, *Introduction to Hybrid Numbers*, Advances in Applied Clifford Algebras **28** (2018).
doi:10.1007/s00006-018-0833-3
- [8] A. Szynal-Liana and I. Włoch, *A note on Jacobsthal quaternions*, Advances in Applied Clifford Algebras **26** (2016) 441–447.
doi:10.1007/s00006-015-0622-1
- [9] A. Szynal-Liana and I. Włoch, *The Pell quaternions and the Pell octonions*, Advances in Applied Clifford Algebras **26** (2016) 435–440.
doi:10.1007/s00006-015-0570-9

Received 13 February 2018
Revised 26 February 2018
Accepted 28 February 2018