

# HIGHER ORDER NICKEL FIBONACCI NUMBERS AND SOME SYMBOLIC COMPUTATIONS

Mücahit AKBIYIK<sup>1,\*</sup>, Seda YAMAÇ AKBIYIK<sup>2</sup>

<sup>1</sup>Istanbul Beykent University, Faculty of Engineering and Architecture, Department of Computer Engineering, Istanbul-Türkiye

<sup>2</sup>Istanbul Topkapı University, Faculty of Engineering, Department of Electric-Electronic Engineering, Istanbul-Türkiye

## ABSTRACT

In this presentation, we first define higher-order Nickel Fibonacci numbers. We then examine the algebraic properties of higher-order Nickel Fibonacci numbers. Finally, we construct higher-order Nickel Fibonacci matrices and study their algebraic properties. In addition, we will develop symbolic computations in MATLAB to support and illustrate the theoretical results.

**Keywords** Higher Order Nickel Fibonacci Numbers · Higher Order Nickel Fibonacci Matrices · Symbolic Computations

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## References

- [1] K Prasad and H Mahato. Cryptography using generalized Fibonacci matrices with Affine–Hill cipher. J Discrete Math Sci Cryptogr 2021; 25:2341–52. <https://doi.org/10.1080/09720529.2020.1838744>.
- [2] Seda Yamaç Akbiyık, The third order Nickel Fibonacci numbers, Logic Journal of the IGPL, Volume 33, Issue 6, December 2025, jzae122, <https://doi.org/10.1093/jigpal/jzae122>
- [3] İrge, V., (2024), Coding Theory On Special Cases Of The Generalized M-Step Fibonacci Sequence, (Doktora Tezi) Zonguldak Bülent Ecevit Üniversitesi, <https://tez.yok.gov.tr/UlusalTezMerkezi/tezSorguSonucYeni.jsp>
- [4] M Akbiyık and J Alo. On third-order bronze Fibonacci numbers. Mathematics 2021; 9:2606. <https://doi.org/10.3390/math9202606>.
- [5] VW De Spinadel. The family of metallic means. Vis Math 1999; 1:33–7. <https://doi.org/10.5642/hmnj.199901.19.14>.
- [6] N. J. A. Sloane. The on-line encyclopedia of integer sequences. Available at <http://oeis.org/>

\*Corresponding Author's E-mail: [mucahitakbiyik@beykent.edu.tr](mailto:mucahitakbiyik@beykent.edu.tr)