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## ON USEFUL SCHEMA IN SURVIVAL ANALYSIS AFTER HEART ATTACK

CZESŁAW STĘPNIAK

*Department of Differential Equations and Statistics*  
*Faculty of Mathematics and Natural Sciences*  
*University of Rzeszów*  
*Pigonia 1, 35–959 Rzeszów, Poland*

**e-mail:** stepniak@umcs.lublin.pl

### Abstract

Recent model of lifetime after a heart attack involves some integer coefficients. Our goal is to get these coefficients in simple way and transparent form. To this aim we construct a schema according to a rule which combines the ideas used in the Pascal triangle and the generalized Fibonacci and Lucas numbers

**Keywords:** lifetime after heart attack, distribution, Fibonacci number, Lucas number, Pascal triangle.

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### REFERENCES

- [1] H. Belbachir and A. Benmezai, *An alternative approach to Cigler's  $q$ -Lucas polynomials*, Appl. Math. Computat. **226** (2014) 691–698. doi:10.1016/j.amc.2013.10.009
- [2] G.B. Diordjević, *Generating functions of the incomplete generalized Fibonacci and generalized Lucas numbers*, Fibonacci Quart. **39** (2004) 106–113.
- [3] A. Dil and I. Mező, *A symmetric algorithm for hyperharmonic and Fibonacci numbers*, Appl. Math. Comput. **206** (2008) 942–951. doi:10.1016/j.amc.2008.10.013
- [4] M. El-Mikkawy and T. Sogabe, *A new family of  $k$ -Fibonacci numbers*, Appl. Math. Comput. **215** (2010) 4456–4461. doi:10.1016/j.amc.2009.12.069
- [5] X. Fu and X. Zhou, *On matrices related with Fibonacci and Lucas numbers*, Appl. Math. Comput. **200** (2008) 96–100. doi:10.1016/j.amc.2007.10.060

- [6] D. Garth, D. Mills and P. Mitchell, *Polynomials generated by the Fibonacci sequence*, J. Integer. Seq. **10** (2007), Article 07.6.8.
- [7] H.H. Gulec, N. Taskara and K. Uslu, *A new approach to generalized Fibonacci and Lucas numbers with binomial coefficients*, Appl. Math. Comput. **230** (2013) 482–486. doi:10.1016/j.amc.2013.05.043
- [8] J.M. Gutiérrez, M.A. Hernández, P.J. Miana and N. Romero, *New identities in the Catalan triangle*, J. Math. Anal. Appl. **341** (2008) 52–61. doi:10.1016/j.jmaa.2007.09.073
- [9] P. Hao and S. Zhi-wei, *A combinatorial identity with application to Catalan numbers*, Discrete Math. **306** (2006) 1921–1940. doi:10.1016/j.disc.2006.03.050
- [10] V.E. Hoggat Jr., *Fibonacci and Lucas Numbers*, Houghton Mifflin (Boston, MA, 1969).
- [11] H. Hosoya, *Fibonacci triangle*, Fibonacci Quart. **14** (1976) 173–178.
- [12] B.D. Jones, *Comprehensive Medical Terminology*, Third Ed. Delmar Publishers (Albany NY, 2008).
- [13] S. Kitaev and J. Liese, *Harmonic numbers, Catalan's triangle and mesh patterns*, Discrete Math. **313** (2013) 1515–1531. doi:10.1016/j.disc.2013.03.017
- [14] E.G. Kocer and N. Touglu, *The Binet formulas for the Pell-Lucas  $p$ -numbers*, Ars Combinatoria **85** (2007) 3–18.
- [15] T. Koshy, *Fibonacci and Lucas Numbers with Applications* (Wiley-Interscience, New York, 2001). doi:10.1002/9781118033067
- [16] T. Koshy, *Fibonacci, Lucas, and Pell numbers, and Pascal's triangle*, Math. Spectrum **43** (2011) 125–132.
- [17] H. Kwong, *Two determinants with Fibonacci and Lucas entries*, Appl. Math. Comput. **194** (2007) 568–571. doi:10.1016/j.amc.2007.04.027
- [18] S.-M. Ma, *Identities involving generalized Fibonacci-type polynomials*, Appl. Math. Comput. **217** (2011) 9297–9301. doi:10.1016/j.amc.2011.04.012
- [19] L. Niven, H. Zuckerman and H. Montgomery, *An Introduction to the Theory of Numbers*, Fifth Ed. (Wiley, New York, 1991).
- [20] J. Petronilho, *Generalized Fibonacci sequences via orthogonal polynomials*, Appl. Mat. Comput. **218** (2012) 9819–9824. doi:10.1016/j.amc.2012.03.053
- [21] L.W. Shapiro, *A Catalan triangle*, Discrete Math. **14** (1976) 83–90. doi:10.1016/0012-365X(76)90009-1
- [22] N. Sloane, *On-Line Encyclopedia of Integer Sequences (OEIS)*, <http://oeis.org>.
- [23] S. Stanimirović, *Some identities on Catalan numbers and hypergeometric functions via Catalan matrix power*, Appl. Math. Comput. **217** (2011) 9122–9132. doi:10.1016/j.amc.2011.03.138

- [24] S. Stanimirović, P. Stanimirović, M. Miladinović and A. Ilić, *Catalan matrix and related combinatorial identities*, Appl. Math. Comput. **215** (2009) 796–805. doi:10.1016/j.amc.2009.06.003
- [25] C. Stepniak, *On distribution of waiting time for the first failure followed by a limited length success run*, Appl. Math. (Warsaw) (2013) 421–430. doi:10.4064/am40-4-3
- [26] N. Tuglu, E.G. Kocer and A. Stakhov, *Bivariate fibonacci like  $p$ -polynomials*, Appl. Math. Comput. **217** (2011) 10239–10246. doi:10.1016/j.amc.2011.05.022
- [27] S. Vajda, *Fibonacci and Lucas Numbers and the Golden Section*, Ellis Horwood (Chichester 1989).
- [28] N.N. Vorobyov, *Fibonacci Numbers*, Publishing House "Nauka", Moscow, 1961 (in Russian).
- [29] A. Włoch, *Some identities for the generalized Fibonacci numbers and the generalized Lucas numbers*, Appl. Math. Comput. **219** (2013) 5564–5568. doi:10.1016/j.amc.2012.11.030
- [30] O. Yayenie, *A note on generalized Fibonacci sequences*, Appl. Math. Comput. **217** (2011) 5603–5611. doi:10.1016/j.amc.2010.12.038

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