

On expansions of families

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Abstract

In this note we investigate family expansions. In particular we show a new result for the well known Levy-Naor family, improving the previous best known bound.

1 Introduction

Let \mathcal{P} denote the world's population throughout history, and let \mathcal{P}_F and \mathcal{P}_M denote its female and male subsets, respectively (note that \mathcal{P}_F and \mathcal{P}_M are not disjoint). The concept of families is one of the cornerstones in the field of human civilization. The so called *traditional family*, as it was first introduced in [1], consists of PARENTS, that is a mother $M \in \mathcal{P}_F$ and a father $F \in \mathcal{P}_M$ (observe the confusing terminology), and their children $Ch(M, F)$, where $Ch_t : \mathcal{P}_F \times \mathcal{P}_M \rightarrow 2^{\mathcal{P}}$ denotes the *Parents-Children* function at time t , and the subindex t is omitted when it is not crucial.

Over the years, many alternative family models have been considered, such as the Mother-Mother family, the Father-Father family, families in which $|\text{PARENTS}| \neq 2$, families in which $\text{PARENTS} \subsetneq \mathcal{P}$ (see, e.g., [2]) and more. In this note we focus on traditional families, which from now on we simply abbreviate to families. Before stating our result we need some more terminology.

Definition 1.1. We say that a given M - F family has been *expanded* at moment t if

$$Ch_{t-1}(M, F) \subsetneq Ch_t(M, F).$$

The expansion of a family is done via a *birth*. We say that a birth was *successful* if it resulted in a new healthy baby, and both baby and mother are well and released to their home. Finally, we say that a birth was *outstanding* if the newborn is cute.

We are now ready to state our result, which will be proved in Section 3.

Theorem 1.2. *Denote the Shani Levy and Alon Naor family by the Levy-Naor family. The following hold.*

- (1) *On Saturday, September 30, 2017, the Levy-Naor family has been expanded.*
- (2) *The birth was successful.*
- (3) *The birth was outstanding.*

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2 Preliminaries

Our graph-theoretic notation is standard and follows that of [3]. No real effort has been made here to optimize the constants appearing in our results. Our results are asymptotic in nature and whenever necessary we assume that n is sufficiently large. We consistently omit floor and ceiling signs throughout this note as they should not appear here. Unless stated otherwise, log stands for a piece of wood.

3 Proof of Theorem 1.2

The proof of part (1) of the theorem can be found at the records of Israel's Ministry of Interior (we omit the straightforward details). The proof of part (2) can be deduced from the fact that this note was written from home. The proof of part (3) is given in Figure 1.



Figure 1: The newborn practicing his air guitar moves

Remark 3.1. *The baby was born on Yom Kippur, which according to a common Jewish belief means that he is righteous (Hebrew: TZADIK). Since this is Jewish folklore, it must be true.*

4 Concluding remarks

In this note we have shown a new lower bound on the size of the Levy-Naor family, improving by one the previous best known bound. Although we were not able to prove it, we strongly believe the following holds.

Conjecture 4.1. *The new addition to the Levy-Naor family, i.e., the baby shown in Figure 1, is the cutest baby in the world.*

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References

- [1] **The Old Testament**, Book of Genesis, chapter 2, verses 21–24.
- [2] L. Katayamajuly, *Love in 2-D*, The New York Times Magazine, July 21, 2009. Can be found at www.nytimes.com/2009/07/26/magazine/26FOB-2DLove-t.html.
- [3] D. B. West, **Introduction to Graph Theory**, Prentice Hall, 2001.