On n-Dimensional Polytope Schemes

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Abstract

Pyramid schemes are a well-known way of taking bundles of money from suckers. This paper is not about them. Although on first inspection, this paper sounds like it is about pyramid schemes, we promise that it is not.

In this work, we define and analyze n-Dimensional Polytope schemes, which generalize pyramid schemes, but are not pyramid schemes. We derive several theoretical and empirical results demonstrating the great opportunities offered by our n-Dimensional Polytope Schemes. In particular, we demonstrate substantially superior growth potential in contrast to all previously published work. In addition to being of theoretical interest, these results mean that you can stay at home and make money in your spare time!

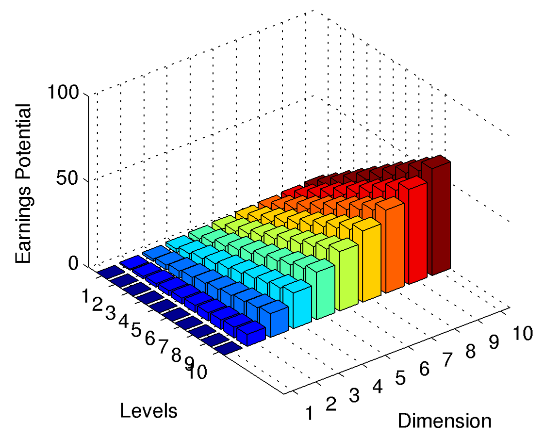

Figure 1. Earnings potential (log scale) as a function of the dimension of the polytope and the number of levels.

1. Introduction and Related Work

This is not a pyramid scheme. This is an easy way for you to make money. It is not related to a pyramid scheme because it is a polytope scheme. For a comparison, please see Fig. 2

If you want guaranteed financial freedom and personal fulfillment from algebraic geometry, sign up now to invest in our gift-giving investment scheme.

2. On High Dimensional Polytopes and Schemes

In machine learning and statistics, using lots of dimensions almost always causes issues; this is known as *the curse of dimensionality*. For instance, distance functions may not behave appropriately (Aggarwal et al., 2001) and various counterintuitive results may arise (Bishop, 2007). There has also been seminal work (Fouhey & Maturana, 2012) on a parallel concept of a "Kurse of Dimensionality", stemming from a desire to have access to certain subspaces of $(\mathbb{R} - \mathbb{Q})^\infty$ without appearing on reality TV. In it, the authors propose a novel Kardashian Kernel and apply it blindly to problems determined by pattern-matching in the index of a machine learning textbook.

Irrespective of previous work by crusty academics, in this particular case, the so-called-curse becomes a **blessing** to work in **your favor**! You can harness the latest in rigorous statistics and mathematics discovered by two computer vision scientists to make money at home while doing no work!

2.1. Generalization of the standard model

In the classic 2-dimensional polytope model, one has to recruit k people for the model. This directly extends to the a generalized n-dimensional case in which one has to k^{n-1} people to make up money. This yields a recurrence relation giving the number of entities in-

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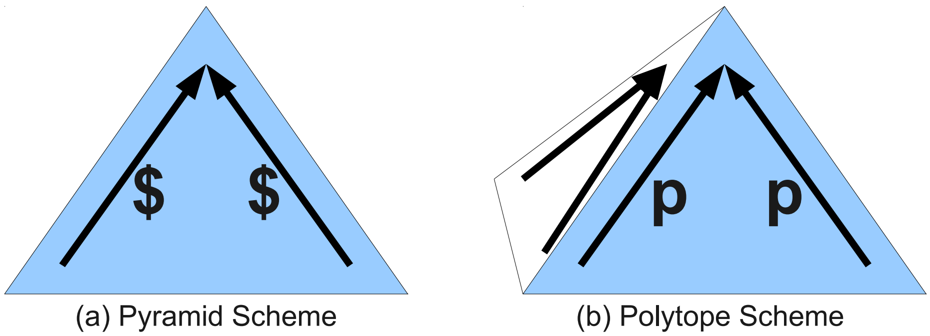

Figure 2. A comparison of our scheme and the traditional pyramid scheme. In a pyramid scheme, dollars travel up a metaphorical 2-dimensional simplex; this results in money lost for participants at the bottom and weeping and gnashing of teeth. In a polytope scheme, points (redeemable for dollars) travel up a metaphorical n-dimensional simplex; this results in **guaranteed money at home via algebraic geometry**

volved in a n-Dimensional Polytope Scheme at the l-th level:

$$\begin{aligned} T(1) &= 1 \\ T(l) &= k^{n-1}T(l-1), \end{aligned} \tag{1}$$

or in closed form, $T(l) = (k^{n-1})^l$

We present graphs of **your earnings** in Fig. 1. We are working so hard to spread the wealth **to you!**

2.2. In Comparison to Pyramid Schemes

The polytope scheme is not a pyramid scheme[1]. In a pyramid scheme, cash is pushed upwards a metaphorical pyramid and the leaders run off with the money as the scheme collapses due to a lack of new marks; in a polytope scheme, points are pushed up a high-dimensional polytope and everyone benefits. This is illustrated in Fig. 2.

3. Guaranteed Income via Algebraic Geometry

Since Hilbert's celebrated proof via elimination ideals that his creditors are owed no money (Hilbert, 1920), it has been accepted that one can eliminate one's debt via algebraic geometry. Nonetheless remains an open question whether one can induce a positive net flow via similar reasoning under more general conditions. In this section, we answer positively, and provide the first known proof of how **you can make money at home via algebraic geometry.**

Theorem 1. *Let R be a ring and let $\mathbf{x}$ be a set of N indeterminates. Let the non-empty set of sources of money be an ideal $\$ \subseteq R[\mathbf{x}]$ and the current bank account be $b \subseteq R[\mathbf{x}]$ such that the two have disjoint varieties $V(\$) \cap V(B) = \emptyset$ (i.e., or the solutions to \$ and your bank account do not intersect). Consider the ideal $\mathfrak{b}$ generated by your bank account, b. Then the multiplication of your bank account's ideal $\mathfrak{b}$ and the n-Dimensional Polytope scheme ($\mathfrak{p} \in R[\mathbf{x}]$) yields an ideal $\mathfrak{s} = \mathfrak{b}\mathfrak{p}$ such that $V(\$) \subseteq V(\mathfrak{s})$ (i.e., the solutions to \$ are now in your grasp).*

Proof. By definition (see supplementary material), $\mathfrak{p} = \{0_R\}$. From definitions,

$$\mathfrak{s} = \{p_1 b_1 + \cdots + p_n b_m : p_i \in \mathfrak{p}, b_j \in \mathfrak{b}\}. \tag{2}$$

Since 0_R is the only element of $\mathfrak{p}$, $\mathfrak{s} = \{0\}$, and $V(\mathfrak{s}) = R^N$. Therefore, for any ideal \$, $V(\$) \subseteq V(\mathfrak{s})$. □

This theorem shows that if there are any sources of money, their solutions can be covered via the n-Dimensional Polytope's ideal, $\mathfrak{p} = \{0_R\}$. Therefore, this provides a guaranteed source of income, irrespective of your current bank account. This corrects already-known deficiencies in previous money-making schemes, e.g., (Hilbert, 1920; Zariksi, 1950; Ponzi, 1920).

On first glance, Theorem 1 resembles the famous Banach-Tarski Paradox (Banach & Tarski, 1924), in which a hypersphere of fiat currency is doubled; however, note that we do not make the fiat-currency assumption, and our proof works in gold and silver-standard frameworks.

[1]Unlike Bayesian Multi-Level Marketing Models (MLMM), which are totally a pyramid scheme.

3.1. How does this make money?

See, Theorem 1 says it makes money so it has been proved.

3.2. But really does it make money?

This makes money, but the best time to join is now! You do not want to be pursuing some Ph.D. when all your friends are pouring crystal all over benjamins in the Cayman islands.

4. Empirical Results

Although our previous derivation of Theorem 1 is sufficient to demonstrate our idea's validity, we have begun empirical evaluations. We are testing the polytope scheme using a variant of the "One Weird Trick" (Maturana & Fouhey, 2013) scheme to attract investors, as well as direct-to-consumer marketing. This "One Weird Kernel Trick" technique overcomes many issues with pyramid schemes; past work, e.g., that of Ponzi (Ponzi, 1920), fails by running out of investors in the instance space $\mathcal{X}$; in the "One Weird Trick" model, one can use a feature map ϕ mapping into an feature space $\mathcal{F}$ to find a potentially infinite number of recruits for the scheme.

Does this make any sense? No, but researchers at The University of Carnegie Mellon[2] are already using this to make money while they watch cat videos. The time to join is **now**!

Our experiments are in its infancy, and now is the best time for you to join!. If you want personal wealth and fulfillment via algebraic geometry, fill out the attached form send your first deposit to:

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Act now! The faster you get on the polytope the more money you can accrue!

References

Aggarwal, C., Hinneburg, A., and Keim, D. On the surprising behavior of distance metrics in high dimensional space. *Database Theory–ICDT 2001*, pp. 420–434, 2001.

Banach, Stefan and Tarski, Alfred. Sur la decomposition des ensembles de points en parties respectivement congruentes. *Fundamenta Mathematicae*, (6): 244–277, 1924.

Bishop, Christopher M. *Pattern Recognition and Machine Learning (Information Science and Statistics)*. Springer, 1st ed. 2006. corr. 2nd printing edition, 2007.

Fouhey, David F. and Maturana, Daniel. The kardashian kernel. In *SIGBOVIK*, 2012.

Hilbert, David. Keine mehr Schulden, enorme Gewinne aus der algebraischen Geometrie. *Beitrge zur Algebra und Geometrie*, 35(3), 1920.

Maturana, Daniel and Fouhey, David F. Find a separating hyperplane with this one weird kernel trick. In *SIGBOVIK*, 2013.

Ponzi, Charles. A new cool way to make money that I tried and some results. Please send me books, this prison library is boring. *Epistulae Mathematicae*, 13 (20):112–123, 1920.

Zariksi, Oscar. Holomorphic get rich quick schemes. *Ann. of Math.*, 23(6), 1950.

[2] Not affiliated with Carnegie Mellon University

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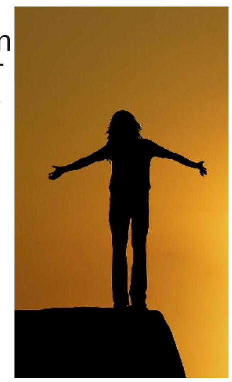

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