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Research Article

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On Types of Average According to the Changing Average

Hasan KELEŞ

Karadeniz Technical University, Department of Mathematics, Campus of Kanuni, Ortahisar, Trabzon, Turkey

Abstract In this paper, Average variants according to the changing mean. According to the constant average, some known average varieties; Arithmetic mean, Geometric mean, and Harmonic mean.

The changing average $\overline{x}_{end}$ is taken for $\{x_1, x_2, ..., x_n\}$ be size n inedependent variables in a system. And exit size l $\{y_1, y_2, ..., y_l\}$ variables from this system and enter size m $\{z_1, z_2, ..., z_m\}$ variables to this system;

$$\overline{x}_{end} = \frac{\sum_{i=1}^{n} x_i - \sum_{j=1}^{l} y_j + \sum_{k=1}^{m} z_k}{n - l + m} \quad [1].$$

In this case; How did the geometric and harmonic average change? It is investigated. Similar to the previously defined arithmetic mean definition, the new definition is given. Some of the benefits and facilities provided by varying averages are given.

It is observed that the fixed average is taken in applications in many engineering problems in life, even in the changing average applications encountered in social life. This restricts the continuity of the solutions in the applications.

Variations of the changing geometric and changing harmonic medium are examined. Some differences between the aforementioned known averages are mentioned. In some calculations, it was emphasized that change is prominent, and the necessity was emphasized.

Keywords Changing averages, Changing Arithmetic mean, Changing Geometric mean, Changing Harmonic mean.

AMS Subject Classification: 62-07, 62D99, 62P05, 65G20

1. Introduction

According to the known fixed average, the solutions of the systems are sought. This produces a partial solution. It is observed that the problems in the systems continue and they are locked after a period of time. If there are inputs and outputs to the system, the environment must also be changed. In this sense, the changing mean definition is given earlier [1]. Thus, it is necessary to change the calculations made depending on them.

Arithmetic mean: $\frac{1}{n}\sum_{i=1}^{n} x_i$, Geometric mean: $\sqrt[n]{\prod_{i=1}^{n} x_i}$ and Harmonic mean, $\frac{1}{\frac{1}{n}\sum_{i=1}^{n}\frac{1}{x_i}}$ for $\{x_1, x_2, ..., x_n\}$.

Now, respectively; Instead of geometric mean, changing geometric mean and harmonic mean instead, changing harmonic mean definitions are given. These definitions; If there is no entry-exit to the system, it keeps the previous known mean definitions.

Many scientists and engineers feel guilty about using the moving average filter. Because it is so very simple, the moving average filter is often the first thing tried when faced with a problem. Even if the problem is completely solved, there is still the feeling that something more should be done. This situation is truly ironic [6].

2. The Changing Geometric and Harmonic Means

The geometric mean of *n* positive numbers is obtained by multiplying them all together and then taking the *n*th root. In algebraic terms, the geometric mean of a_1, a_2, ..., a_n is defined as

$$\sqrt[n]{\prod_{i=1}^{n} x_i} .$$

Ifthe changing average $\overline{x}_{end}$ is taken for $\{x_1, x_2, ..., x_n\}$ be size n independent variables in a system. And exit size l $\{y_1, y_2, ..., y_l\}$ variables from this system and enter size m $\{z_1, z_2, ..., z_m\}$ variables to this system.

$$\sqrt[n-l+m]{\frac{\left(\prod_{i=1}^{n} x_i\right)\left(\prod_{k=1}^{m} z_i\right)}{\prod_{j=1}^{l} y_i}} .$$

Similarly, the harmonic mean is given as follows.

$$\frac{n-l+m}{\sum_{i=1}^{n}\frac{1}{x_i}-\sum_{j=1}^{l}\frac{1}{y_j}+\sum_{k=1}^{m}\frac{1}{z_k}} .$$

The changing arithmetic mean is the simple average of a set of values, the changing sum of the values divided by the changing number of values. It is appropriate for situations such as the average rate for a journey composed of segments of equal time and distance.

The changing geometric rate is the $(n-l+m)$ th root of the product of the values, and is appropriate for situations such as deriving a single value to represent scores from multiple scales. The single value could then be used to compare an overall ranking of scores.

The changing geometric mean use to summarize bacteria data because those data are so variable. Bacteria can grow at an exponential rate very quickly under the right conditions. The changing geometric mean value will not be overly influenced by large fluctuations from between one data point and the next. The geometric mean of the system will be in the immediate vicinity of the calculation of the next average.

The changing harmonic mean is the reciprocal of the changing arithmetic means of the reciprocals of a set of values. It is useful for calculations such as the changing average rate for a journey composed of segments of differing times *or* distances. A *weighted* changing harmonic mean can be used to calculate the changing average rate of a journey composed of differing times *and* distances.

3. Results and Discussions

The calculation of all these changing averages shortens the validity of the system. Protects the actual values. In addition to calculating instantaneous, geometric and harmonic averages in the system, it also determines the trends of the next data. In the harmonic mean, while the number of variables exhibits an important situation, the changing harmonic mean is the variables that come out of the system are of great importance.

The tests performed on average, it was observed that it varied according to the average. In the analysis of the data, the fixed result is calculated. In the evaluation of continuously changing data, the changing average is strengthened.

In particular, the bacteria in the laboratories provide great convenience and reality in the analysis of the rapidly changing bacteria in their analysis.

In the data analysis and analysis, the results of the calculations are presented.

References:

[1]. Keles, H. On Changing Averages and Results in Systems, UMTEB - 4. ULUSLARARASI MESLEKİ VE TEKNİK BİLİMLER KONGRESİ, 7-9 Aralık - ERZURUM, 2018.
[2]. Kanji K.G. 100 STATISTICAL TESTS, SAGE Publications Ltd1 Oliver's Yard 55 City Road London ECIY ISP, Third edition published 2006.
[3]. R. Movellan, " Introduction to Probability Theory and statistics", Javier, (2008).
[4]. E. T. Jaynes, "Probability Theory The Logic of Science", Cambridge University Press, Cambridge, New York, Melbourne, Madrid, Cape Town, Singapore, São Paule, (2003).
[5]. S. Prasanna. Salat, "Probability and Mathematical Statistic", Louisville, (2013).
[6]. Smith S. W., (1999), The Scientist and Engineer's Guide to Digital Signal Processing Second Edition Chapter 15, Moving Average Filters, Printed in the United States of America, page 277-282.