# Forecasting Thai Traditional Drugs Values Using Grey System Theory with Fractional Order Buffer Operator and Periodic Correction Models

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**Abstract**

The quantitative prediction of Thai traditional drugs for human production values is important to the national policy on traditional herbal development. The production values from Bureau of Drug Control, Food and Drug of Thailand (Thai FDA) during 1987 to 2013 showed the upward trend nonstationary time series. The grey system theory with fractional order buffer operator GM(1,1) model or $p/q\ WGM(1,1)$ has the feature to deal with this type of time series and the traditional GM(1,1) also the subset of $p/q\ WGM(1,1)$. The $p/q$ buffer operator is weighted the past data before input to the GM(1,1) model, the $p/q$ with minimum mean absolute percentage error (MAPE) is selected as the prediction model. The production values during 1987 to 2013 are used as input, the results from the conventional varying $p/q$ computations show the minimum MAPE at $p/q=0$, then the *0*WGM(1,1) model or the traditional GM(1,1) model is the forecasting model. The algorithm to find the optimal $p/q$ with minimum MAPE should be developed for $p/q\ WGM(1,1)$. For the upward trend time series of Thai traditional drugs for human production values, the expanded from of GM(1,1) with the Fourier series periodic correction model (GM(1,1)E&PC) exhibits lower MAPE than the minimum MAPE from $p/qWGM(1,1)$.

***Keywords***: Buffer operator, Forecasting, Grey system theory, Periodic correction, Thai traditional drug

## 1. Introduction

Bureau of Drug Control, Food and Drug of Thailand (Thai FDA) showed the local production value of Thai traditional drugs for human during 1987 to 2013 that the values were risen from 208 to 4,723 Million Baht [1-2]. The news agency also claimed the figure from Department of International Trade Promotion, Ministry of Commerce that the export value of Thai traditional drugs were about 10,000 Million Baht in 2014 [3]. In 2015, the local market value of herbal drugs was about 5,850 Million Baht with 7 percent growth [4]. From the previous sources, the production value in 2014 would be at 5,467.29 Million Baht ($5,850\times100/107$). The data of local production value of Thai Traditional drugs for human were gathered from the registered producers at the end of each year and also demand for a period of time in data processing to produce the report. The up to date data and projected future of Thai traditional drugs are also the important information for the national policy makers' decision. From Table 1, the time series of production value of Thai Traditional drugs during 1987 to 2013 had an upward trend in data over time which is a nonstationary time series [5-6]. In order to verify the value in 2014 2015 and to forecast the value for 2016 to complete the time series, the Grey prediction models seem appropriate for this situation.

Grey system theory was initiated in 1982 [7], and has been applied in many fields [8]. Grey series forecasting demonstrates the fast, concise, accurate, and effective predictions and understand future trends with the ability of fitting prediction using small data sets and limited information [9]. GM(1,1) is the basic model and suitable for the stable time series [10], and the fractional order buffer operator is the technique that weighing the past data to eliminate the impact of external shock in the nonstationary data. The GM(1,1) model with the fractional order ( $p/q$ ) weak buffer operator (WBO) or $p/q$ WGM(1,1) is more complex than the traditional GM(1,1) that uses only original data because the buffer operator is used instead. The six examples which one in energy consumption, two in electricity consumption, one in discharge rate of industrial wastewater, one in logistics demand, and one in energy production were shown that $p/q$ WGM(1,1) has been deemed more accurate than the traditional GM(1,1) [11].

In this study, the fractional order buffer operator GM(1,1) is applied to predict the local production value of Thai traditional drugs for human in the year 2014, 2015, and 2016. The expanded form of GM(1,1) model [10] combined with Fourier series periodic correction model [12] is benchmarked in precision against the optimal $p/q$ WGM(1,1) model.

This paper is organized as follows: Section 2 introduces the mathematical calculation of the fractional order buffer operator, parameters $a$ and $b$ in GM(1,1), the expanded form of GM(1,1) with Fourier series periodic correction (GM(1,1)E&PC) and the flow chart shows the $p/q$ interpolation steps to get the minimum mean absolute percentage error (MAPE); Section 3 illustrates the prediction results; and Section 4 presents the conclusions.

## 2. Research Methodology

*2.1 The GM(1,1) Model*

Grey Model First Order One Variable GM(1,1) is a basic model with its computational efficiency in the a time series forecasting model. The Accumulation Generating Operation (AGO) applies to the primitive data in order to smooths the randomness, the differential equation is solved and the Inverse Accumulated Generating Operation (IAGO) is applied to find the predicted values of original data [8].

Consider $X^{(0)}$ that denotes the production value of nonnegative sequence and $n$ is the sample size of the data. After applying AGO to $X^{0}$ using Eq. (3), $X^{(1)}$ the monotonic increasing sequence is obtained. $Z^{(1)}$ is the mean sequence that generates from $X^{(1)}$ using Eq. (5). The least square estimate sequence of the grey difference equation of GM(1,1) is defined in Eq. (6). The whitening equations is shown in Eq. (7). $[a,b]^{T}$ is the sequence of parameters that can be solved by the method of least squares in Eq. (8). According to Eq. (7), the solution of $X^{(1)}(t)$ at time $k$ is in Eq. (11), and by IAGO the original sequence can be expressed in Eq. (12) [10]. $X^{(0)}$ and $X^{(1)}$ are the forecast values of the individual values and the accumulated values.

$$X^{(0)}=\left(x^{(0)}(1),...,x^{(0)}(n)\right) \tag{1}$$

$$X^{(1)}=\left(x^{(1)}(1),...,x^{(1)}(n)\right) \tag{2}$$

$$x^{(1)}(k)=\sum_{i=1}^{k}x^{(0)}(i),\ k=1,2,...,n \tag{3}$$

$$Z^{(1)}=(z^{(1)},z^{(2)},...,z^{(n)}) \tag{4}$$

$$z^{(1)}(k)=0.5x^{(1)}(k)+0.5x^{(1)}(k+1),\quad k=2,3,...,n \tag{5}$$

$$x^{(0)}(k)+az^{(1)}(k)=b \tag{6}$$

The first order ordinary differential equation of $X^{(1)}$ as:

$$\frac{dX^{(1)}}{dt}+aX^{(1)}=b \tag{7}$$

$a$ and $b$ are called the developing coefficient and grey input respectively.

$$\begin{bmatrix} a \\ b \end{bmatrix} = \left(B^T B\right)^{-1} B^T Y, \tag{8}$$

where

$$B = \begin{bmatrix} -z^{(1)}(2) & 1 \\ -z^{(1)}(3) & 1 \\ \cdots & \cdots \\ -z^{(1)}(n) & 1 \end{bmatrix} \tag{9}$$

$$Y = \left(x^{(0)}(2), x^{(0)}(3), \ldots, x^{(0)}(n)\right)^T \tag{10}$$

$$x^{(1)}(k+1) = \left(x^{(0)}(1) - \frac{b}{a}\right)e^{-ak} + \frac{b}{a} \tag{11}$$

$$x^{(0)}(k+1) = \left(1 - e^{a}\right)\left(x^{(0)}(1) - \frac{b}{a}\right)e^{-ak}, k = 1,2,\ldots,n \tag{12}$$

The grey development coefficient $a$ should not be zero. When $a = 0$, the prediction equation fails from divided by zero, solving by the L'hospital's rule the next predictive value is $x^{(0)}(k+1) = b$ [9].

### 2.3 Expanded Form of GM(1,1) Model

The expanded form of GM(1,1) model (GM(1,1)E) is the method that produces lower relative error than GM(1,1) [10]. The equations for GM(1,1)E are shown in Eq. (13-4).

$$x^{(0)}(k) = \beta - \alpha x^{(1)}(k-1) \tag{13}$$

where

$$\beta = \frac{b}{1+0.5a} \text{ and } \alpha = \frac{a}{1+0.5a}$$

$$x^{(0)}(k) = \beta - \alpha x^{(0)}(1)e^{-a(k-2)} \tag{14}$$

### 2.4 The Fourier Series Periodic Correction Model

To improve the accuracy by correcting the model's periodical errors through the Fourier series [12], the GM(1,1)E from Eq. (14) is brought to adjust error in Eq. (15-6)

$$\varepsilon^{(0)}(k) = x^{(0)}(k) - \hat{x}^{(0)}(k) \tag{15}$$

$$\varepsilon^{(0)}(k) \cong \frac{1}{2}a_0 + \sum_{i=1}^{z}\left[a_i \cos\left(\frac{2\pi i}{T}k\right) + b_i \sin\left(\frac{2\pi i}{T}k\right)\right], \quad k = 2,3,\ldots,n. \tag{16}$$

$$T = n-1 \text{ and } z = \frac{(n-1)}{2} - 1.$$

where $T$ is an integer and $z$ is rounded down to the smallest integer.

Eq. (16) can be arranged into Eq. (17) with matrix from in Eq. (18-20). The Fourier series periodic correction equation is Eq. (21).

$$\varepsilon^{(0)} \cong PC \tag{17}$$

$$P=\begin{bmatrix} \frac{1}{2} & \cos\left(2\frac{2\pi}{T}\right) & \sin\left(2\frac{2\pi}{T}\right) & \cos\left(2\frac{2\pi 2}{T}\right) & \sin\left(2\frac{2\pi 2}{T}\right) & \dots & \cos\left(2\frac{2\pi z}{T}\right) & \sin\left(2\frac{2\pi z}{T}\right) \\ \frac{1}{2} & \cos\left(3\frac{2\pi}{T}\right) & \sin\left(3\frac{2\pi}{T}\right) & \cos\left(3\frac{2\pi 2}{T}\right) & \sin\left(3\frac{2\pi 2}{T}\right) & \dots & \cos\left(3\frac{2\pi z}{T}\right) & \sin\left(3\frac{2\pi z}{T}\right) \\ \dots & \dots & \dots & \dots & \dots & \dots & \dots & \dots \\ \frac{1}{2} & \cos\left(n\frac{2\pi}{T}\right) & \sin\left(n\frac{2\pi}{T}\right) & \cos\left(n\frac{2\pi 2}{T}\right) & \sin\left(n\frac{2\pi 2}{T}\right) & \dots & \cos\left(n\frac{2\pi z}{T}\right) & \sin\left(n\frac{2\pi z}{T}\right) \end{bmatrix} \tag{18}$$

$$C=\begin{bmatrix} a_0 & a_1 & b_1 & a_2 & b_2 & \dots & a_n & b_n \end{bmatrix}^T \tag{19}$$

$$C \cong \left(P^T P\right)^{-1} P^T \varepsilon^{(0)} \tag{20}$$

$$x_r^{(0)}(k) = x^{(0)}(k) - \varepsilon^{(0)}(k) \tag{21}$$

$X_r^{(0)}$ is the Fourier series periodic correction. Eq. (21) is the prediction equation of the expanded form of GM(1,1) with Fourier series periodic correction (GM(1,1)E&PC).

*2.5 The Fractional Order Buffer Operator*

The definition of the fractional order buffer operator and the theory related to the relationship between a weakening buffer operator (WBO) and a strengthening buffer operator (SBO) are as follows [11].

**Definition.** Assume the raw data sequence is $X=\{x(1),x(2),...,x(n)\}$, $XD=\{x(1)d,x(2)d,...,x(n)d\}$ where

$$x(k)d=\frac{x(k)+x(k+1)+...+x(n)}{n-k+1}, \tag{22}$$

then $D$ is a first order WBO no matter whether $X$ is either monotonic decreasing, increasing, or vibrating.

For $A=\begin{bmatrix} \frac{1}{n} & 0 & \cdots & 0 \\ \frac{1}{n} & \frac{1}{n-1} & \cdots & 0 \\ \vdots & \vdots & \ddots & \vdots \\ \frac{1}{n} & \frac{1}{n-1} & \cdots & 1 \end{bmatrix}$,

$$\begin{aligned} XD &= \{x(1)d,x(2)d,...,x(n)d\} \\ &= XA \end{aligned} \tag{23}$$

and for $p/q \in R^{+}$ order of WBO is

$$XD^{p/q} = [x(1), x(2), ..., x(n)]A^{p/q}. \quad (24)$$

**Theorem 1.** For original data $X = [x(1), x(2), ..., x(n)]$, $-p/q$ $(p/q \in R^{+})$ order WBO is the $p/q$ order SBO.

*2.6 The GM(1,1) Model with p/q Order Buffer Operator*

The procedures of GM(1,1) model with $p/q$ order WBO ( $p/q$ WGM(1,1)) are more complex than traditional GM(1,1) that the $p/q$ WBO $\left(X^{(0)}D^{p/q}\right)$ must be computed and brings to GM(1,1) instead of the original sequence $\left(X^{(0)}\right)$. The developing coefficient ( $a^{*}$ ) and grey input ( $b^{*}$ ) from the fractional order ( $p/q^{*}$ ) which shows the best fitted prediction model (minimum error) will be selected to forecast the future periods. The fractional order GM(1,1) flow chart is shown in Figure 1.

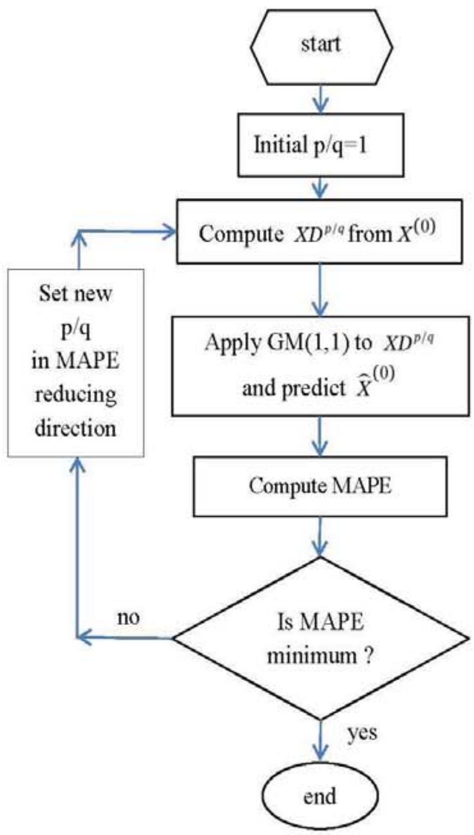


Figure 1: Fractional Order GM(1,1) Flow Chart

*2.7 Mean Absolute Percentage Error Analysis*

The prediction precision in this study is the mean absolute percentage error (MAPE) which is the average of the absolute value of relative percentage errors [12].

$$MAPE = \left( \frac{1}{n} \sum_{k=1}^{n} \left| \frac{\hat{x}^{(0)}(k) - x^{(0)}(k)}{x^{(0)}(k)} \right| \right) \times 100\% , \qquad (25)$$

and $k=1$ should be excluded because $\hat{x}^{(0)}(1) - x^{(0)}(1)$ is always zero.

All models in this study are designed in MATLAB using custom scripts [13].

**3. Research Results and Discussion**

*3.1 p/q Order Buffer Operator*

The $p/q$ WBO $\left(X^{(0)}D^{p/q}\right)$ or $p/q$ order buffer operator is the weighted values that apply to the past data, because the total sum by rows for each column of matrix $A^{p/q}$ from Eq. (14) is always equal to 1 when $p/q \geq 0$. For $p/q$=1, the matrix $A^1$ shows equal weight $(1/n, 1/(n-1),...,1)$ for the first value, the second value,…, and the latest value, respectively. When $p/q$=0, the $\left(X^{(0)}D^{p/q}\right)$ is $\left(X^{(0)}D^{0}\right) = X^{(0)}$, and *0*WGM(1,1) is GM(1,1). The total sum by rows for each column of matrix $A^{p/q}$ is still equaled to 1, this means that the values multiply to past data with additions and/or subtractions have the result of only one portion of the $n$ past data and for $p/q > 0$, the element in each column is the weighted value.

The sample of $p/q$ order buffer operator, for $n = 4$, *p/q =-5.00, -1.00, -0.75, -0.50, -0.25, 0.00, 0.25, 0.50, 0.75, 1.00, 5.00* are shown in Appendix A.

*3.2 The Minimum MAPE*

The real values of Thai traditional drugs production in Million Baht from 1987 to 2013 from Table 1 are the input to $p/q$ WGM(1,1) to forecast 2014 to 2016. The $p/q$ values are vary from -5 to 3 to find the MAPEs as shown in Table 2 and Figure 2, and the minimum MAPE is 17.17% when $p/q$ =0.000, that is the MAPEs from *0*WGM(1,1)) or the traditional GM(1,1).

Table 1: Real Values vs. GM(1,1) and GM(1,1)E&PC Prediction Values of Thai Traditional Drugs Production
Unit in Million Baht

| Year | Real Values | GM(1,1) or θWGM(1,1) | GM(1,1) E&PC | Year | Real Values | GM(1,1) or θWGM(1,1) | GM(1,1) E&PC |
|---|---|---|---|---|---|---|---|
| 1987 | 208 | 208 | 208 | 2000 | 675 | 774 | 657 |
| 1988 | 243 | 146 | 225 | 2001 | 737 | 889 | 755 |
| 1989 | 269 | 168 | 287 | 2002 | 869 | 1,021 | 851 |
| 1990 | 294 | 193 | 276 | 2003 | 1,203 | 1,174 | 1,221 |
| 1991 | 226 | 221 | 244 | 2004 | 1,389 | 1,349 | 1,371 |
| 1992 | 263 | 255 | 245 | 2005 | 1,485 | 1,550 | 1,503 |
| 1993 | 285 | 292 | 303 | 2006 | 2,197 | 1,781 | 2,179 |
| 1994 | 415 | 336 | 397 | 2007 | 2,184 | 2,046 | 2,202 |
| 1995 | 304 | 386 | 322 | 2008 | 2,543 | 2,351 | 2,525 |
| 1996 | 318 | 444 | 300 | 2009 | 2,799 | 2,701 | 2,817 |
| 1997 | 252 | 510 | 270 | 2010 | 3,140 | 3,104 | 3,122 |
| 1998 | 485 | 586 | 467 | 2011 | 3,517 | 3,567 | 3,535 |
| 1999 | 548 | 673 | 566 | 2012 | 3,704 | 4,099 | 3,686 |
| | | | | 2013 | 4,723 | 4,709 | 4,741 |
| | | | Forecasts | 2014 | *5,467*** | 5,412 | 5,461 |
| | | | | 2015 | *5,850** | 6,218 | 6,274 |
| | | | | 2016 | | 7,145 | 7,127 |
| | | | MAPE | | | 17.17% | 3.27% |

Sources: Real Values from Bureau of Drug Control, Food and Drug of Thailand [1],
* from ThansettakijMultimedia [4],
** derived from [4].

Table 2: Fractional Orders (p/q) and Mean Absolute Percentage Errors (MAPE)

| p/q | MAPE (%) | p/q | MAPE(%) |
|---|---|---|---|
| -5.000 | 14,588,270.47 | | |
| -4.000 | 4,872.00 | | |
| -3.000 | 533.41 | 3.000 | 552.66 |
| -2.000 | 181.61 | 2.000 | 418.33 |
| -1.500 | 111.43 | | |
| -1.000 | 200.67 | 1.000 | 217.65 |
| -0.500 | 2,789.97 | | |
| -0.250 | 172.54 | | |
| -0.100 | 30.22 | | |
| -0.050 | 20.10 | 0.500 | 97.19 |
| -0.025 | 17.80 | 0.025 | 17.82 |
| -0.010 | 17.29 | 0.010 | 17.27 |
| **0.000** | **17.17** | | |

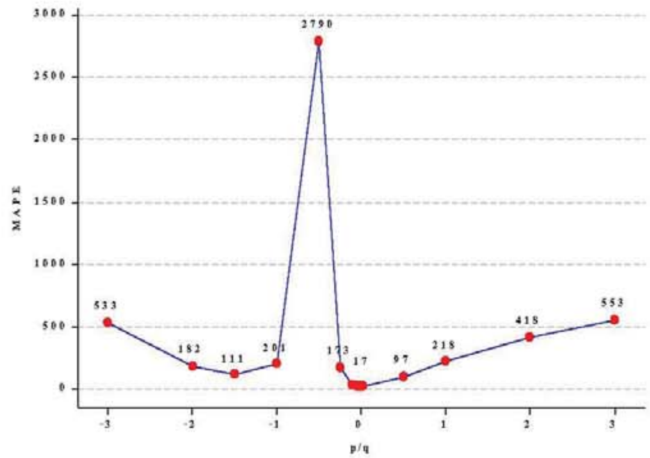


Figure 2: Fractional Order (p/q) and Mean Absolute Percentage Error (MAPE)

*3.3 The $p/q$ WGM(1,1) model Forecast values*

The $p/q$ WGM(1,1) model with minimum MAPE is selected to forecast the Thai traditional drugs production values for 2014-2016, the predicted values are shown in the GM(1,1) column in Table 1. The line graph of real values plot against predicted values from *0*WGM(1,1) or GM(1,1) are shown in Figure 3.

The minimum MAPE at 17.17% from *0*WGM(1,1) or GM(1,1) is very high, then the $p/q$ WGM(1,1) model could not be a good model for the Thai traditional drugs production values series.

*3.4 The GM(1,1)E&PC model*

The Thai traditional drugs production values of the year 1987-2013 are the input to the GM(1,1)E&PC model as mentioned in Sub-section 2.3 and 2.4, the predicted values are shown in the GM(1,1)E&PC column in Table 1. The MAPE is only 3.27%, which lower than 17.17% of 0WGM(1,1).

The comparative line graphs of real values, *0*WGM(1,1), and GM(1,1)E&PC are shown in Figure 3.

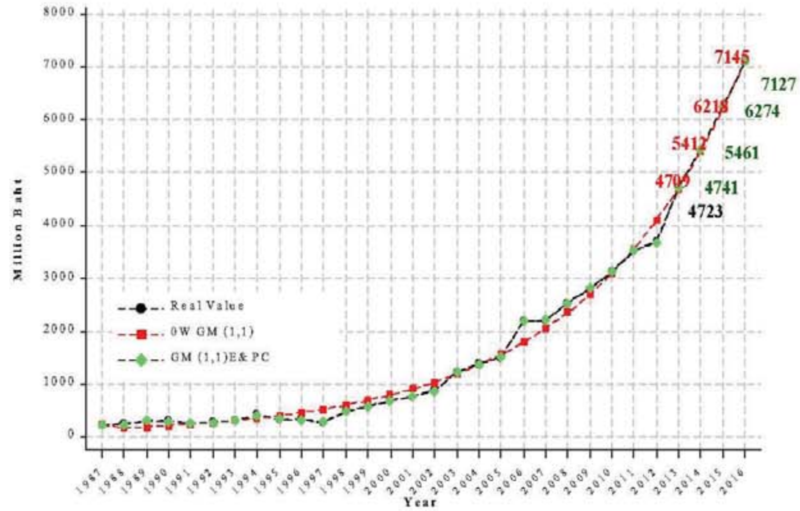


Figure 3: Real Values vs. **θWGM(1,1)** and **GM(1,1)E&PC** Prediction Values of Thai Traditional Drugs Production

## 4. Conclusions and Recommendations

The θWGM(1,1) model (with minimum MAPE = 17.17%) predicts values for 2014-2015 when compare to the values from the news agency, the difference 5,412-5,467 = -55 (-1.01%) and 6,218-5,850 =368 (+6.29%) in 2014 and 2015 respectively. The forecast value for 2016 is 7,145 Million Baht.

The GM(1,1)E&PC model (with MAPE = 3.27%) predicts values for 2014-2015 when compare to the values from the news agency, the difference 5,461-5,467 = -6 (-1.01%) and 6,274-5,850 = 424 (+7.25%) in 2014 and 2015 respectively. The forecast value for 2016 is 7,127 Million Baht.

The consistent between quantitative prediction and qualitative analysis conclusion is left to the concerned authorities' decision.

The optimal $p/q$ by conventional search is too computational experiments, the MAPE curve in Figure 2 needs the appropriated algorithm to determine the $p/q^*$ optimal solution. To improve the forecasting accuracy, the GM(1,1)E&PC model also exhibits better MAPE than the $p/q$ WGM(1,1) model. Whatever other Grey improvement models such as Grey Verhulst [15] should be considered.


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**7. Appendix A**

**The Sample of p/q Order Buffer Operator.**

For n=4, p/q=-5.00, -1.00, -0.75, -0.50, -0.25, 0.00, 0.25, 0.50, 0.75, 1.00, 5.00.

| | Column | | | | | | Column | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| p/q | 1 | 2 | 3 | 4 | Row | p/q | 1 | 2 | 3 | 4 |
| -5.00 | 1,024.00 | 0.00 | 0.00 | 0.00 | 1 | 5.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | -2,343.00 | 243.00 | 0.00 | 0.00 | 2 | | 0.01 | 0.00 | 0.00 | 0.00 |
| | 1,710.00 | -422.00 | 32.00 | 0.00 | 3 | | 0.07 | 0.05 | 0.03 | 0.00 |
| | -390.00 | 180.00 | -31.00 | 1.00 | 4 | | 0.92 | 0.94 | 0.97 | 1.00 |
| | 1.00 | 1.00 | 1.00 | 1.00 | Total | | 1.00 | 1.00 | 1.00 | 1.00 |
| -1.00 | 4.00 | 0.00 | 0.00 | 0.00 | 1 | 1.00 | 0.25 | 0.00 | 0.00 | 0.00 |
| | -3.00 | 3.00 | 0.00 | 0.00 | 2 | | 0.25 | 0.33 | 0.00 | 0.00 |
| | 0.00 | -2.00 | 2.00 | 0.00 | 3 | | 0.25 | 0.33 | 0.50 | 0.00 |
| | 0.00 | 0.00 | -1.00 | 1.00 | 4 | | 0.25 | 0.33 | 0.50 | 1.00 |
| | 1.00 | 1.00 | 1.00 | 1.00 | Total | | 1.00 | 1.00 | 1.00 | 1.00 |
| -0.75 | 2.83 | 0.00 | 0.00 | 0.00 | 1 | 0.75 | 0.35 | 0.00 | 0.00 | 0.00 |
| | -1.65 | 2.28 | 0.00 | 0.00 | 2 | | 0.26 | 0.44 | 0.00 | 0.00 |
| | -0.15 | -1.20 | 1.68 | 0.00 | 3 | | 0.21 | 0.31 | 0.59 | 0.00 |
| | -0.04 | -0.08 | -0.68 | 1.00 | 4 | | 0.18 | 0.25 | 0.41 | 1.00 |
| | 1.00 | 1.00 | 1.00 | 1.00 | Total | | 1.00 | 1.00 | 1.00 | 1.00 |
| -0.50 | 2.00 | 0.00 | 0.00 | 0.00 | 1 | 0.50 | 0.50 | 0.00 | 0.00 | 0.00 |
| | -0.80 | 1.73 | 0.00 | 0.00 | 2 | | 0.23 | 0.58 | 0.00 | 0.00 |
| | -0.15 | -0.64 | 1.41 | 0.00 | 3 | | 0.16 | 0.26 | 0.71 | 0.00 |
| | -0.05 | -0.10 | -0.41 | 1.00 | 4 | | 0.11 | 0.16 | 0.29 | 1.00 |
| | 1.00 | 1.00 | 1.00 | 1.00 | Total | | 1.00 | 1.00 | 1.00 | 1.00 |
| -0.25 | 1.41 | 0.00 | 0.00 | 0.00 | 1 | 0.25 | 0.71 | 0.00 | 0.00 | 0.00 |
| | -0.29 | 1.32 | 0.00 | 0.00 | 2 | | 0.16 | 0.76 | 0.00 | 0.00 |
| | -0.09 | -0.25 | 1.19 | 0.00 | 3 | | 0.08 | 0.16 | 0.84 | 0.00 |
| | -0.03 | -0.06 | -0.19 | 1.00 | 4 | | 0.05 | 0.08 | 0.16 | 1.00 |
| | 1.00 | 1.00 | 1.00 | 1.00 | Total | | 1.00 | 1.00 | 1.00 | 1.00 |
| 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1 | | | | | |
| | 0.00 | 1.00 | 0.00 | 0.00 | 2 | | | | | |
| | 0.00 | 0.00 | 1.00 | 0.00 | 3 | | | | | |
| | 0.00 | 0.00 | 0.00 | 1.00 | 4 | | | | | |
| | 1.00 | 1.00 | 1.00 | 1.00 | Total | | | | | |