



International Conference And Workshop On Mathematical Analysis And Its Application

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July 21th, 2017

NOTIFICATION OF ACCEPTANCE

Dear **Nahlia Rakhmawati**,

On behalf of the committee, we're pleased to inform that your abstract entitled

“DESIGN OF PUBLIC TRANSPORTATION SCHEDULE MODELS IN JOMBANG USING MAX-PLUS ALGEBRA” (AA-103)

has been **ACCEPTED** to be presented at International Conference and Workshop On Mathematical Analysis and Its Applications 2017 (ICWOMAA 2017).

Please note that all presenters are required to pay the registration fee for the conference before we finalize the program. If you have any further questions, please feel free to contact us.

We are looking forward to meet you in Malang, Indonesia.



Sincerely yours,

Prof. Dr. Marjono, M.Phil.
Chairperson ICWOMAA 2017



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Reviewer Comments :

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Design of Public Transportation Models In Jombang By Applying Max-Plus Algebra

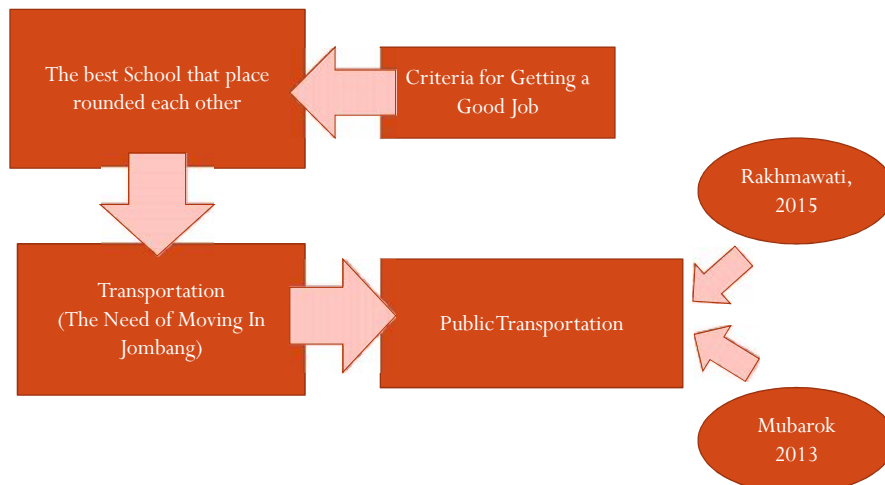
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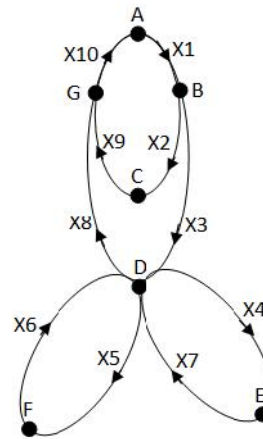
Introduction



Public Transportation In Jombang

In this research, it had been arranged for the design of village transportation which covered 3 routes which had been passed by the village transportation with the code B, C, and G. The three routes were used because based on the research (Mubarok, 2013), that these three village transportations fulfilled sufficient criteria for the performance assessment .

PICTURE 1. Directed Graph from the Three Routes



Max-Plus Algebra

Definision of Max-Plus Algebra [6]

Let $R_{\mathcal{E}} = R \cup \{\varepsilon\}$ with R is set of all real numbers and $\varepsilon = -\infty$. In $R_{\mathcal{E}}$ defined the following operations:

$$\forall x, y \in R_{\mathcal{E}}, x \oplus y \stackrel{def}{=} \max\{x, y\} \text{ and } x \otimes y \stackrel{def}{=} x + y.$$

Matrix in max-plus algebra define by $R_{\max}^{n \times m}$. For $n \in \mathbb{N}$ we have $\underline{n} = \{1, 2, 3, \dots, n\}$. Element matrix $A \in R_{\max}^{n \times m}$ in i -rows and j -columns noted as a_{ij} , where $i \in \underline{n}$ and $j \in \underline{m}$. We write matrix A as

$$A = \begin{pmatrix} a_{1,1} & a_{1,2} & \dots & a_{1,m} \\ a_{2,1} & a_{2,2} & \dots & a_{2,m} \\ \vdots & \vdots & \ddots & \vdots \\ a_{n,1} & a_{n,2} & \dots & a_{n,m} \end{pmatrix}.$$

Algorithm used to decide eigen value and eigen vector from the matrix $A \in R_{\max}^{n \times n}$ done repeatedly from the form of

linear equation $x(k+1) = \bigoplus_{p=1}^M (A_p \otimes x(k+1-p))$ where M was maximum armada in each routes [7].

Public Transportation Model In Jombang By Applying Max-Plus Algebra

$$x_1(k+1) = 20 \otimes x_{10}(k-1)$$

$$x_2(k+1) = 15 \otimes x_1(k-1)$$

$$x_3(k+1) = 15 \otimes x_1(k-1)$$

$$x_4(k+1) = (30 \otimes x_3(k-2)) \oplus (20 \otimes x_6(k-1)) \oplus (15 \otimes x_7(k-1))$$

$$x_5(k+1) = (30 \otimes x_3(k-2)) \oplus (20 \otimes x_6(k-1)) \oplus (15 \otimes x_7(k-1))$$

$$x_6(k+1) = 20 \otimes x_5(k-1)$$

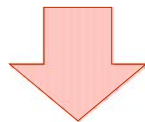
$$x_7(k+1) = 15 \otimes x_4(k-1)$$

$$x_8(k+1) = (30 \otimes x_3(k-2)) \oplus (20 \otimes x_6(k-1)) \oplus (15 \otimes x_7(k-1))$$

$$x_9(k+1) = 30 \otimes x_2(k-2)$$

$$x_{10}(k+1) = (30 \otimes x_9(k-2)) \oplus (20 \otimes x_8(k-1))$$

$$A = \begin{pmatrix} A_1 & A_2 & A_3 \\ E & v(10,10) & v(10,10) \\ v(10,10) & E & v(10,10) \end{pmatrix}$$



$$x(k+1) = \bigoplus_{p=1}^M (A_p \otimes x(k+1-p))$$

$$A_1 = v(10,10)$$

$$A_2 = \begin{pmatrix} v & v & v & v & v & v & v & v & v & 20 \\ 15 & v & v & v & v & v & v & v & v & v \\ 15 & v & v & v & v & v & v & v & v & v \\ v & v & v & v & v & 20 & 15 & v & v & v \\ v & v & v & v & v & 20 & 15 & v & v & v \\ v & v & v & v & 15 & v & v & v & v & v \\ v & v & v & v & v & 20 & 15 & v & v & v \\ v & v & v & v & v & v & v & v & v & v \\ v & v & v & v & v & v & v & 20 & v & v \end{pmatrix}$$

$$A_3 = \begin{pmatrix} v & v & v & v & v & v & v & v & v & v \\ v & v & v & v & v & v & v & v & v & v \\ v & v & 30 & v & v & v & v & v & v & v \\ v & v & 30 & v & v & v & v & v & v & v \\ v & v & v & v & v & v & v & v & v & v \\ v & v & v & v & v & v & v & v & v & v \\ v & v & 30 & v & v & v & v & v & v & v \\ v & 30 & v & v & v & v & v & v & v & v \\ v & v & v & v & v & v & v & v & 30 & v \end{pmatrix}$$

Acknowledgments

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THANK YOU



NO : 470/UN10.F09.14/PP/2017



CERTIFICATE

This certificate is awarded to

Nahlia Rakhmawati

in recognition of his/her active participation as presenter paper entitled


**Design of Public Transportation Models in Jombang By Applying
Max-Plus Algebra**

at International Conference and Workshop on Mathematical Analysis and Its Applications
on 31 July – 3 August 2017 at Brawijaya University Malang

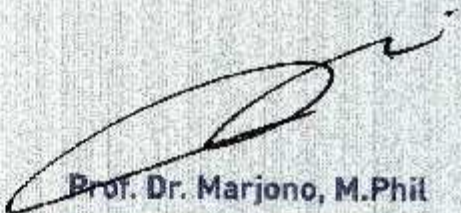
Malang, 2 August 2017



Prof. Dr. Ir. Mohammad Bisri, M.S.
RECTOR OF BRAWIJAYA UNIVERSITY



Ratno Bagus Edy W, S.Si, M.Si, Ph.D
HEAD OF DEPARTMENT OF MATHEMATICS



Prof. Dr. Marjono, M.Phil
CHAIRMAN OF ICWOMAA 2017



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