

## ABSTRAK

### PENYELESAIAN PERSAMAAN DIFERENSIAL EKSAK SEPULUH VARIABEL MENGGUNAKAN APLIKASI MATLAB

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Penelitian tentang penyelesaian persamaan diferensial eksak dengan 2 sampai 5 variabel telah dilakukan sebelumnya secara manual dan memakan waktu lama dalam pengerjaannya.

Penelitian ini akan membahas tentang penyelesaian persamaan diferensial eksak 10 variabel, bentuk umum :

$$\begin{aligned} &f_1(x_1, x_2, x_3, x_4, x_5, x_6, x_7, x_8, x_9, x_{10})dx_1 + f_2(x_1, x_2, x_3, x_4, x_5, x_6, x_7, x_8, x_9, x_{10})dx_2 + \\ &f_3(x_1, x_2, x_3, x_4, x_5, x_6, x_7, x_8, x_9, x_{10})dx_3 + f_4(x_1, x_2, x_3, x_4, x_5, x_6, x_7, x_8, x_9, x_{10})dx_4 + \\ &f_5(x_1, x_2, x_3, x_4, x_5, x_6, x_7, x_8, x_9, x_{10})dx_5 + f_6(x_1, x_2, x_3, x_4, x_5, x_6, x_7, x_8, x_9, x_{10})dx_6 + \\ &f_7(x_1, x_2, x_3, x_4, x_5, x_6, x_7, x_8, x_9, x_{10})dx_7 + f_8(x_1, x_2, x_3, x_4, x_5, x_6, x_7, x_8, x_9, x_{10})dx_8 + \\ &f_9(x_1, x_2, x_3, x_4, x_5, x_6, x_7, x_8, x_9, x_{10})dx_9 + f_{10}(x_1, x_2, x_3, x_4, x_5, x_6, x_7, x_8, x_9, x_{10})dx_{10} = 0 \end{aligned}$$

Faktor integrasi akan ditentukan untuk persamaan diferensial tidak eksak. Metode penyelesaian secara otomatis akan dibuat dengan menggunakan aplikasi matlab.

Penyelesaian persamaan diferensial eksak 10 variabel secara otomatis dengan aplikasi matlab tidak memakan banyak waktu daripada dikerjakan secara manual.

**Kata Kunci :** Persamaan diferensial eksak, faktor integrasi, aplikasi matlab

## ABSTRACT

### SOLUTION OF EXACT DIFFERENTIAL EQUATION WITH TEN VARIABLES USING MATLAB APPLICATION

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Research on solution of exact differential equations with 2 to 5 variables has been done manually before and take a long time to do it.

This research will discuss about solution of exact differential equation with 10 variables, general form :

$$\begin{aligned} &f_1(x_1, x_2, x_3, x_4, x_5, x_6, x_7, x_8, x_9, x_{10})dx_1 + f_2(x_1, x_2, x_3, x_4, x_5, x_6, x_7, x_8, x_9, x_{10})dx_2 + \\ &f_3(x_1, x_2, x_3, x_4, x_5, x_6, x_7, x_8, x_9, x_{10})dx_3 + f_4(x_1, x_2, x_3, x_4, x_5, x_6, x_7, x_8, x_9, x_{10})dx_4 + \\ &f_5(x_1, x_2, x_3, x_4, x_5, x_6, x_7, x_8, x_9, x_{10})dx_5 + f_6(x_1, x_2, x_3, x_4, x_5, x_6, x_7, x_8, x_9, x_{10})dx_6 + \\ &f_7(x_1, x_2, x_3, x_4, x_5, x_6, x_7, x_8, x_9, x_{10})dx_7 + f_8(x_1, x_2, x_3, x_4, x_5, x_6, x_7, x_8, x_9, x_{10})dx_8 + \\ &f_9(x_1, x_2, x_3, x_4, x_5, x_6, x_7, x_8, x_9, x_{10})dx_9 + f_{10}(x_1, x_2, x_3, x_4, x_5, x_6, x_7, x_8, x_9, x_{10})dx_{10} = 0 \end{aligned}$$

The integration factor will be determined for non-exact differential equation. Automatic solution method will be created using matlab application.

Solving automatically an exact differential equation of 10 variables with matlab application does not take much time than it does manually.

**Keywords :** exact differential equation, integration factor, matlab application