Object Oriented Modeling and Programming in Engineering

Homework 1

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1. From an oscillating energy system, you've got the equation for the power:

Whereat:

For this system you want to calculate the energy consumption E(t) for t=20 seconds.

1. UML Diagram

The UML diagram presented in the Figure 1 is used to show and explain the class ***MainClass\_Homework1*** and the methods used to calculate and graph the area of the function using 3 different numerical methods and the analytical function, the class. The C# is called MainClass\_Homework1.

The UML diagram presented in the Figure 2 is used to show and explain the class ***TestFunction***, this class is used to test the class ***MainClass\_Homework1***

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Figure UML MainClass\_Homework1

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Figure UML TestFunction

1. Function plots

* Function plot.

A graph of a function

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Figure Function Plot

* Method 1.

A graph on a graph

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Figure Graph method 1

* Method 2.

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Figure Graph method 2

* Method 3.

A graph of a function

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Figure Graph method 3

1. Nassi – Schneiderman Diagrams

Method 1.

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Figure Nassi – Schneiderman Diagrams - Method 1

Method 2.

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Figure Nassi – Schneiderman Diagrams - Method 2

Method 3.

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Figure Nassi – Schneiderman Diagrams - Method 3

1. Results of the numerical and analytical methods.

the manual calculation of this integral is: 635.69

Result method 1 of calculation of the integral is: 603.9055

Result method 2 of calculation of the integral is: 634.100775

Result method 3 of calculation of the integral is: 634.100775

1. Result absolute error and relative error.

Absolute Error for Method 1 : 31.7845

Relative Error for Method 1 : 0.0526315789473684

Absolute Error for Method 2 : 1.58922499999994

Relative Error for Method 2 : 0.00250626566416031

Absolute Error for Method 3 : 1.58922499999994

Relative Error for Method 3 : 0.00250626566416031