

VARIANT 2

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# **PROGRAMMING ASSIGNMENT REPORT**

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### EXACT SOLUTION

$$y' = -2y + 4x$$

$$y' + 2y = 4x$$

$$y = uv \quad y' = u'v + uv'$$

$$u'v + uv' + 2uv = 4x$$

$$u'v + u(v' + 2v) = 4x$$

$$(1) \quad v' + 2v = 0$$

$$v' = -2v$$

$$\int \frac{dv}{v} = -2 \int dx$$

$$v = e^{-2x}$$

$$(2) \quad u'v = 4x$$

$$u'e^{-2x} = 4x$$

$$u' = 4xe^{2x}$$

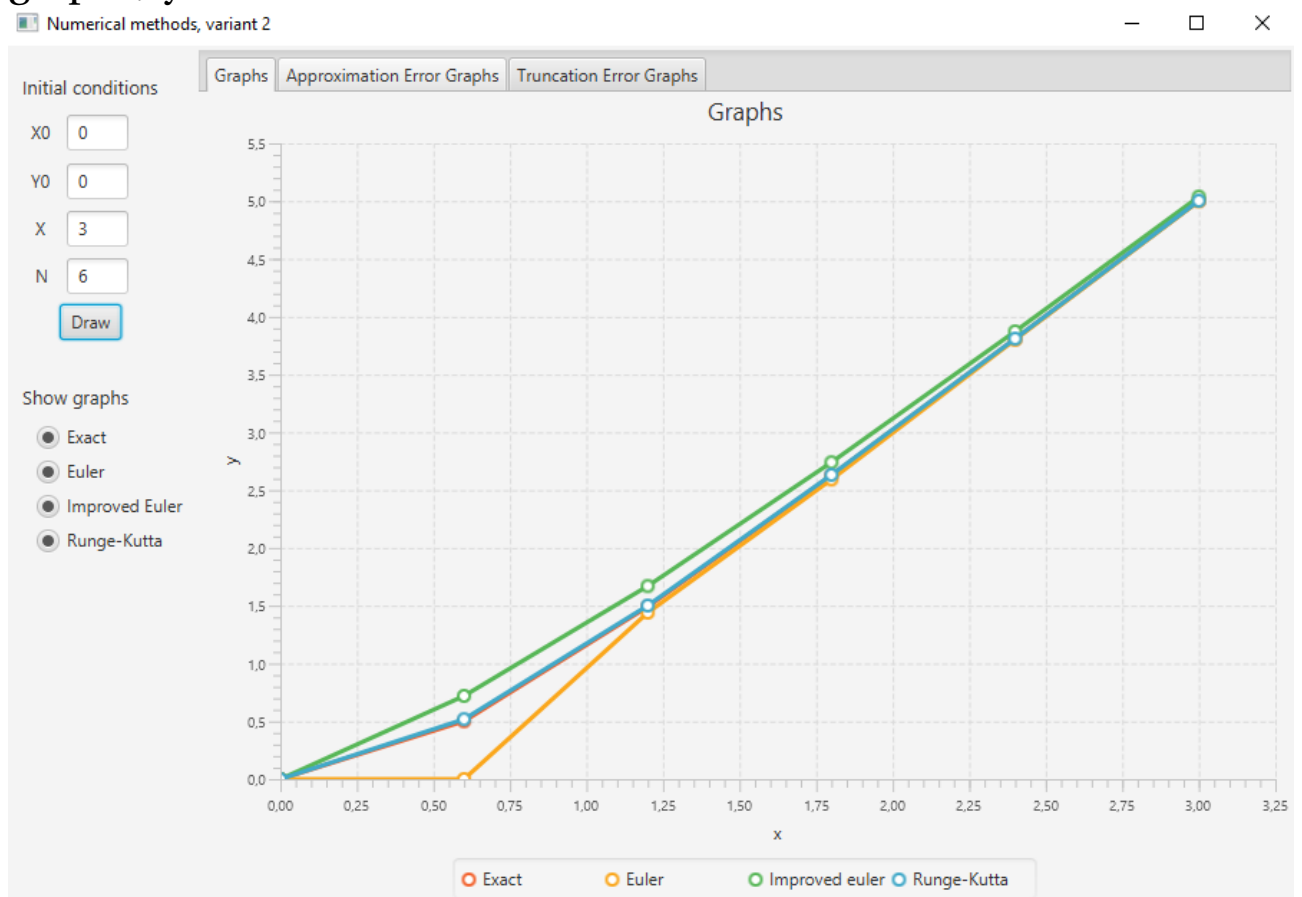
$$u = e^{2x}(2x - 1) + C$$

$$y = uv = 2x - 1 + Ce^{-2x}$$

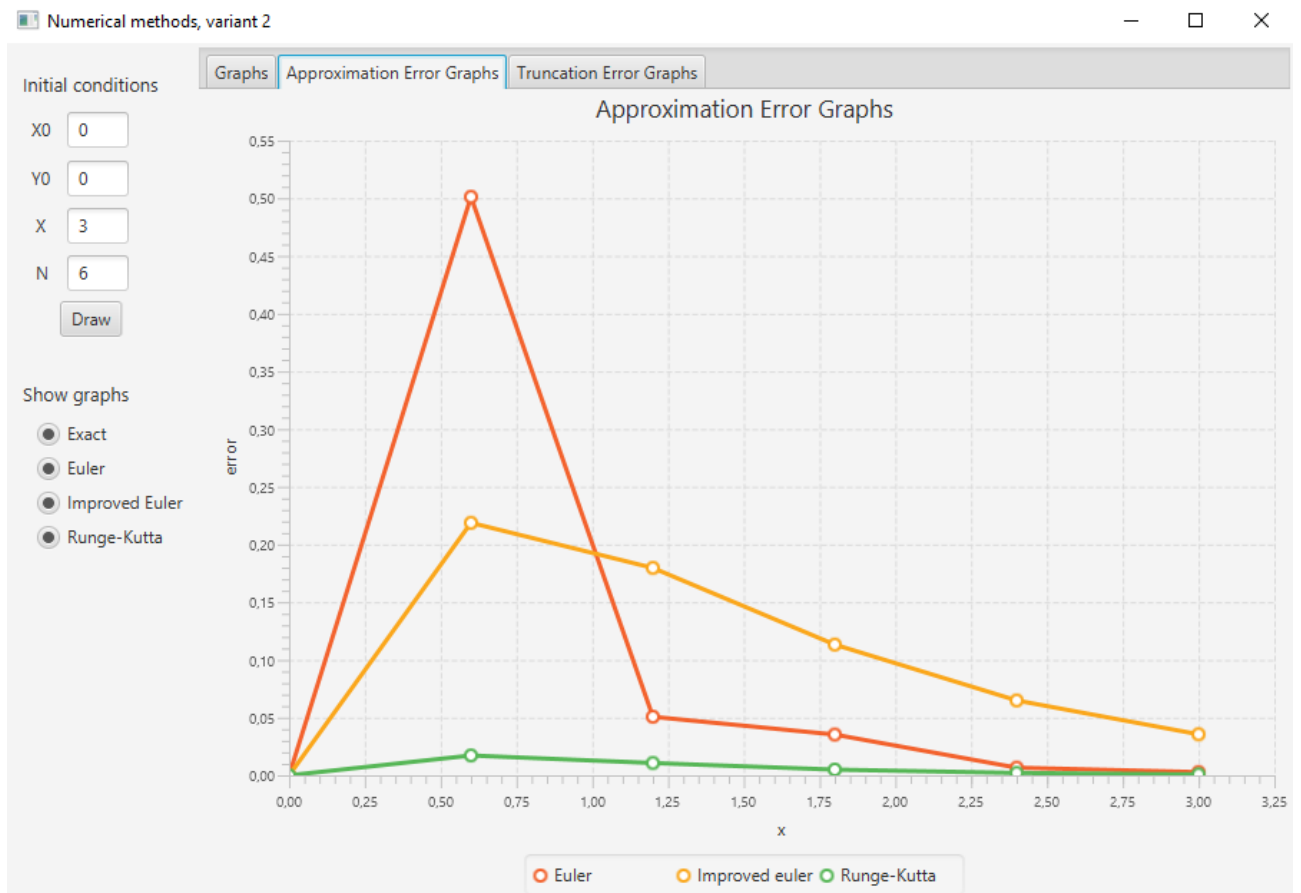
## GRAPH

In the left part of view you can set initial conditions and press button "Draw" to draw graphs, also you can select or unselect which types of graphs (Exact, Euler, Improved Euler, Runge-Kutta) you wants to see in all line charts.

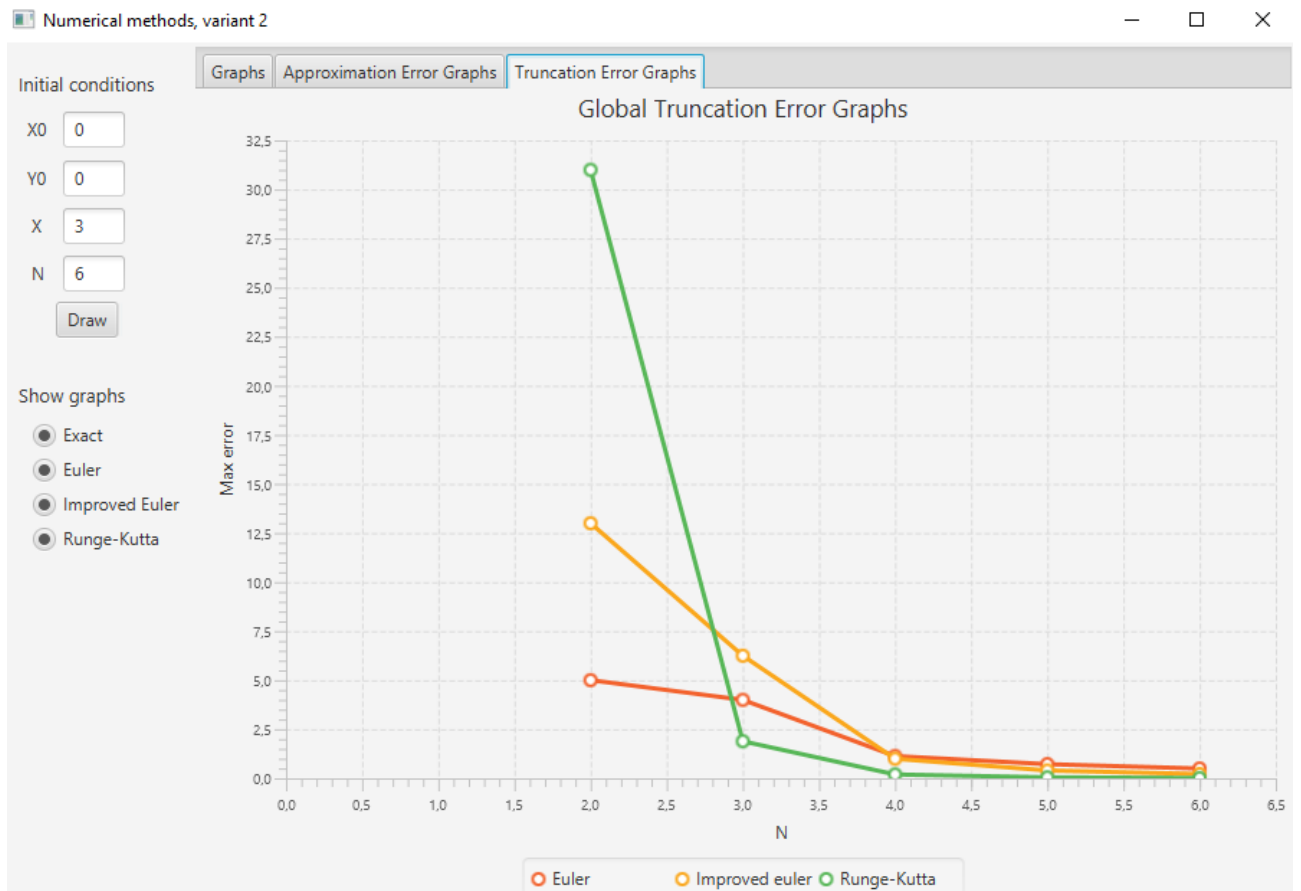
In the right part of view you can select which line charts (Graphs, Approximation error graphs, Global truncation error graphs) you want to see.



Picture 1: Graphs



Picture 2: Approximation error



Picture 3: Global error