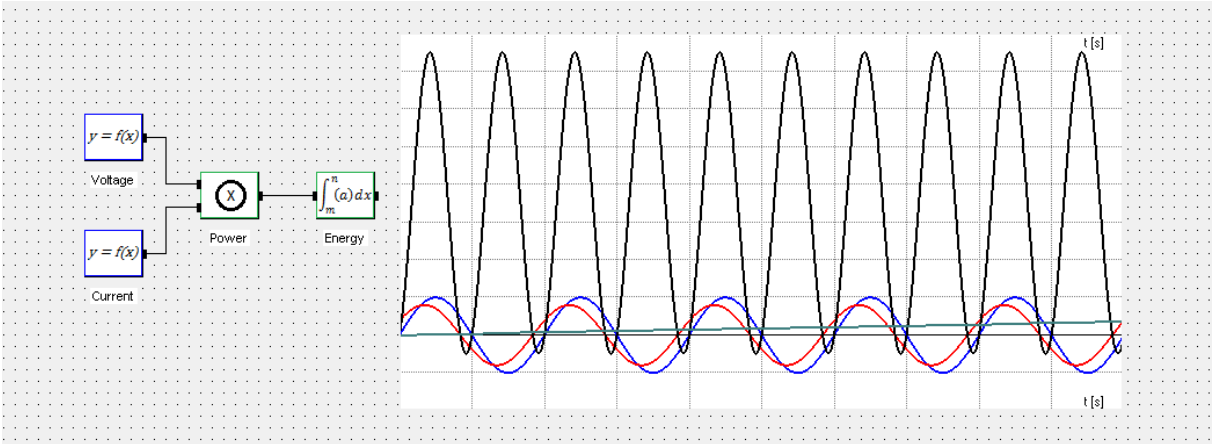
Quick Start Guide



Brace*Calc* Calculation Studio 4

Contents

1 What is BraceCalc?

BraceCalc is a simple and independent software. It provides graphic presentations of mathematical calculations.

BraceCalc shows you general mathematical conditions simple and easy.
It is very appropriate for documentations and presentations.

You can separate the calculations by the ***BraceCalc*** objects source, method and filter within a schematic or within curve outputs.

BraceCalc runs with Microsoft Windows 7, 8, 10.

Main parts:

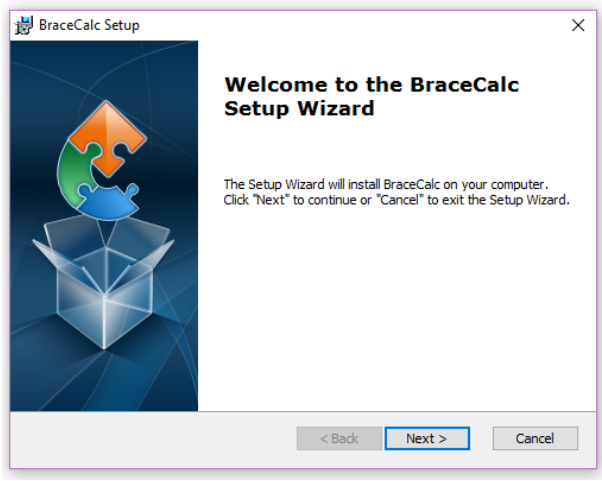
- Windows program with ribbon menu.
- Schematic object view.
- Curve object view with zoom and cursors.
- Function definition with ***BraceCalc*** script.
- Mathematical methods.
- Digital signal analyse
- Analog and digital filter calculations.

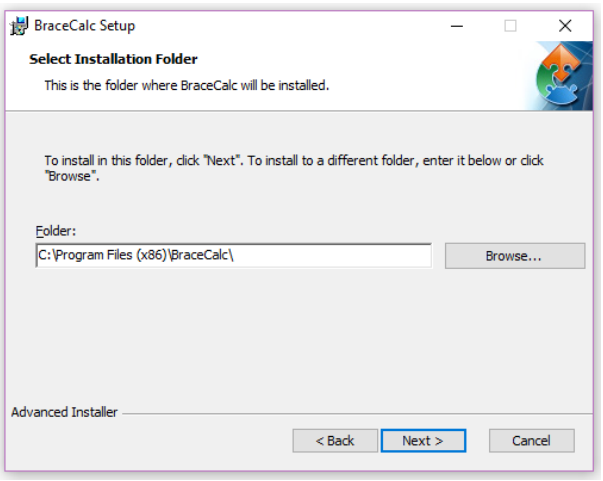
BraceCalc is not:

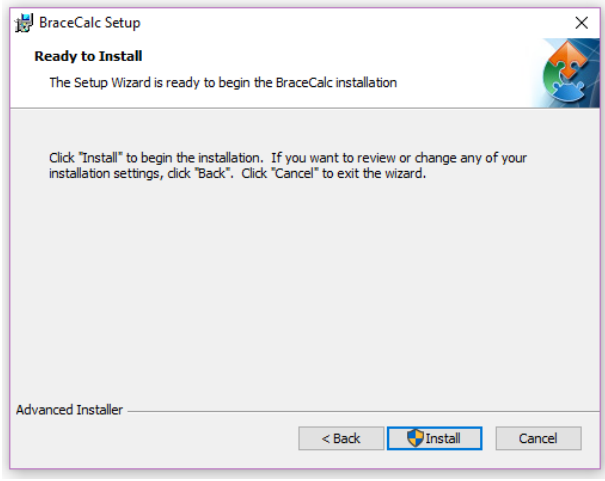
- A complete alternative for software package like MatLab®, Mathematica®, Plecs®, MathCad® or other mathematical software packages.
- A simulation software for complex systems.
- A symbolic algebra software.

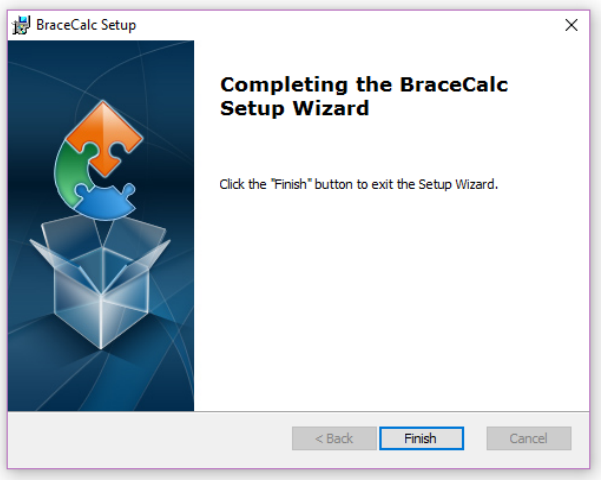
2 Installation

You can download **bracecalc.msi** as a MSI installation software.
Double-click on it and the installation starts.

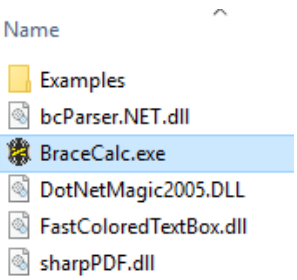




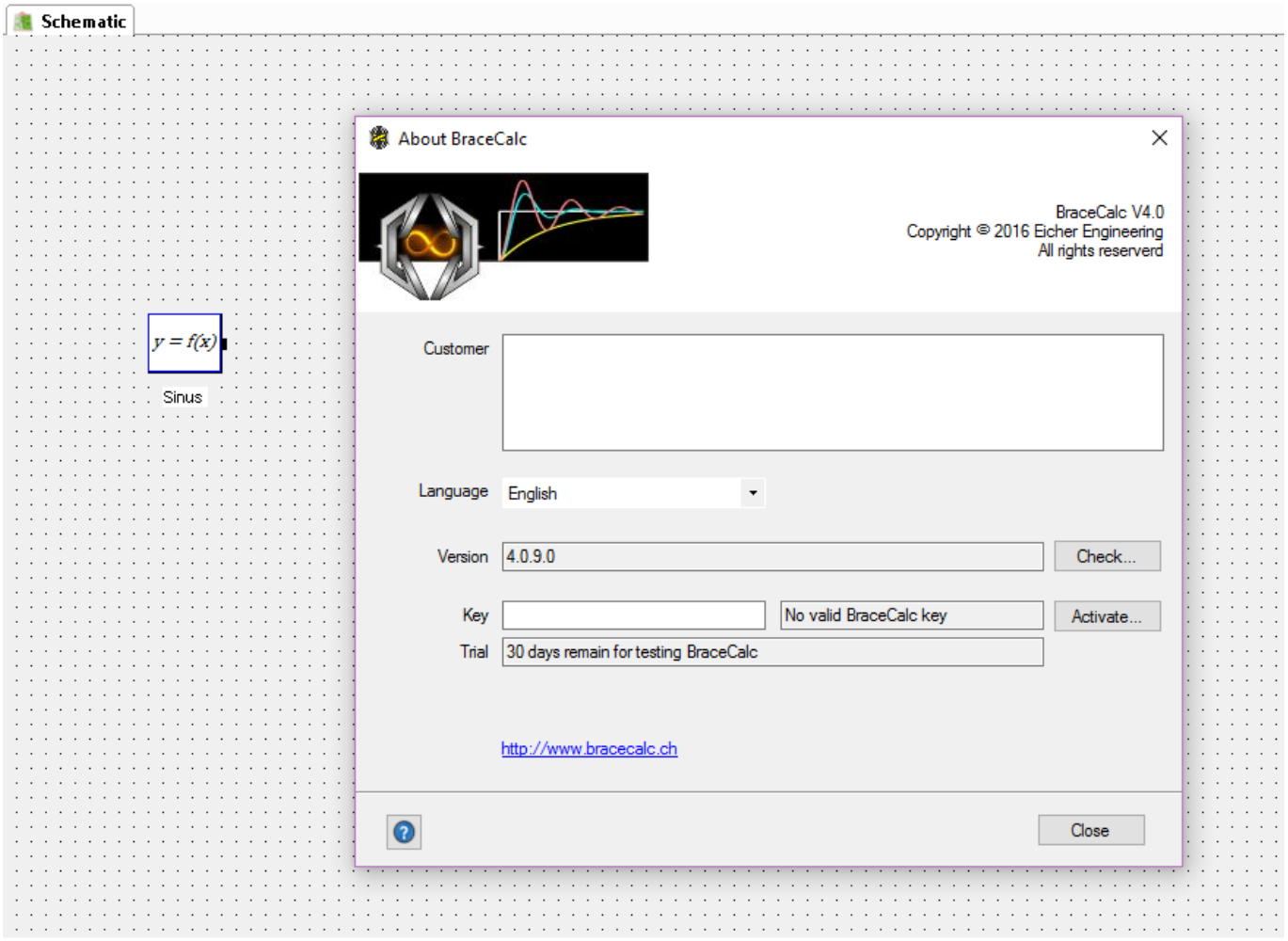




Change to the new created ***BraceCalc*** folder and start ***BraceCalc*** with a double-click on **BraceCalc.exe**.



The <About BraceCalc…> dialog appears after the first start of ***BraceCalc***.
You have a 30 days trial licence without a valid ***BraceCalc*** licence key.



You can insert a valid ***BraceCalc*** license key. Push <Activate…> to activate your ***BraceCalc***.

You can insert the key later at any time.

This dialog appears every time without a valid license key. After 30 days ***BraceCalc*** will close automatically after pushing <Close>.

3 Tutorial

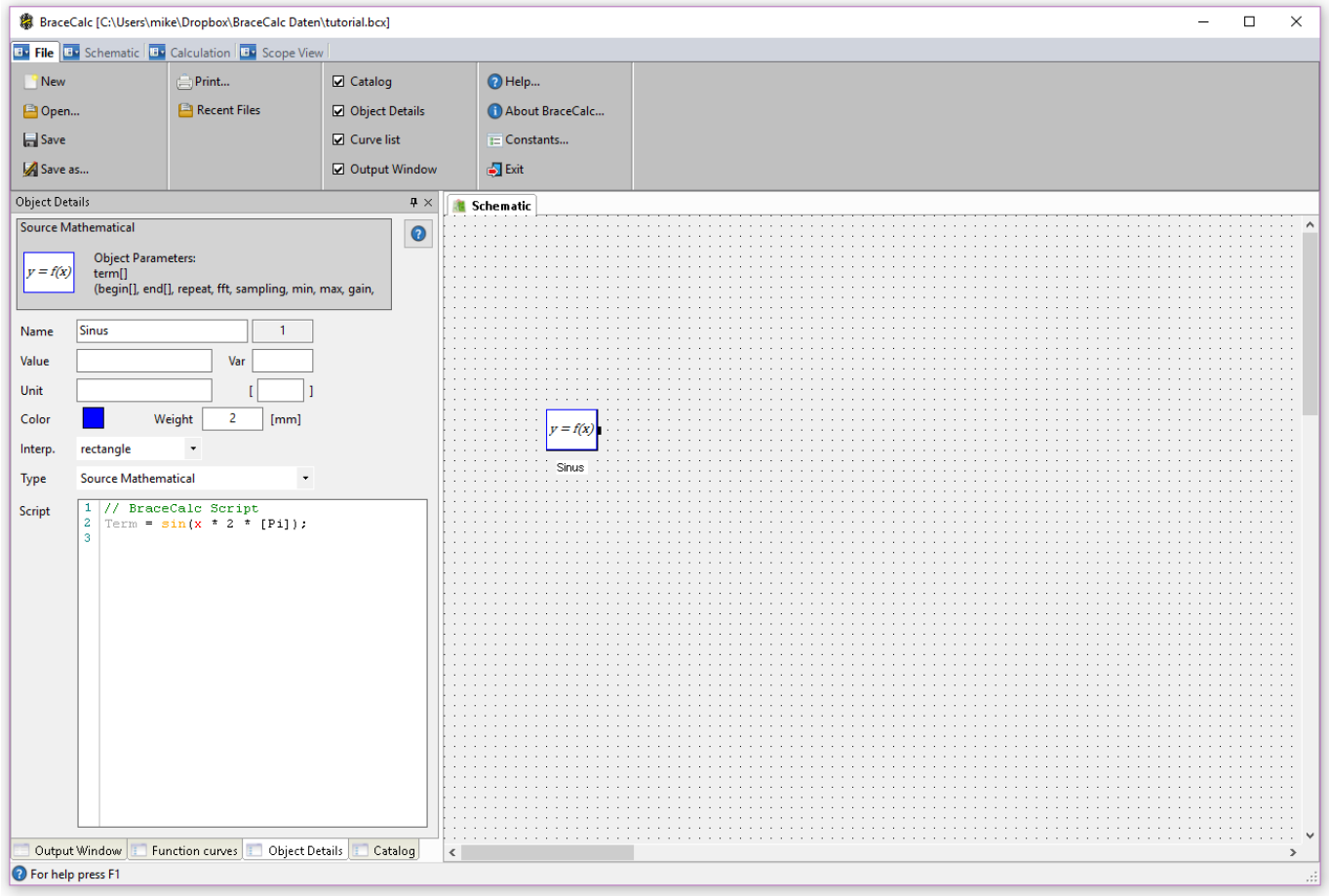
3.1 General

The following tutorial shows how to work with BraceCalc.
We use general electro technic aspects with alternating voltages and alternating currents.

3.2 New file

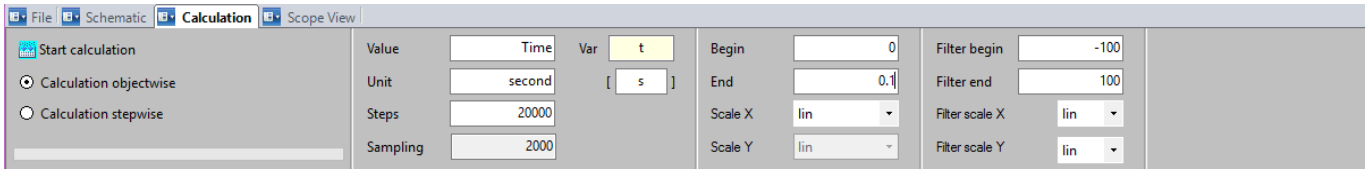
At first, we check all docking windows in the file menu. You can place it were you want.

Click on <File><new> and a new file with one standard source object has created.
Save this with <File><Save as…> with the name **tutorial.bcx**.



3.3 Calculation parameters

Now we determine the frame conditions for our calculations.
We like to calculate some electro technic signals within a time scale.
The start is at 0 second and goes until 0.1 second. These are 5 periods for 50Hz signals.



3.4 Objects

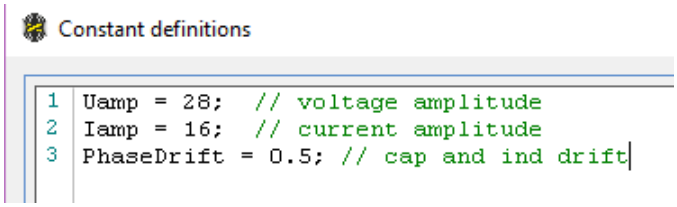
3.4.1 General

We use this signals calculations:

- Input voltage 50Hz
- Input currents 50 Hz, resistive, capacitive, inductive.
- Input currents 50 Hz, half wave, rectangle.
- Power calculation.
- Energy calculation.
- Fourier transformation of the rectangle current.

3.4.2 Inputs

All input signals are ***BraceCalc*** source objects.
For a better script view, we first define following constants in <File><Constants…>.

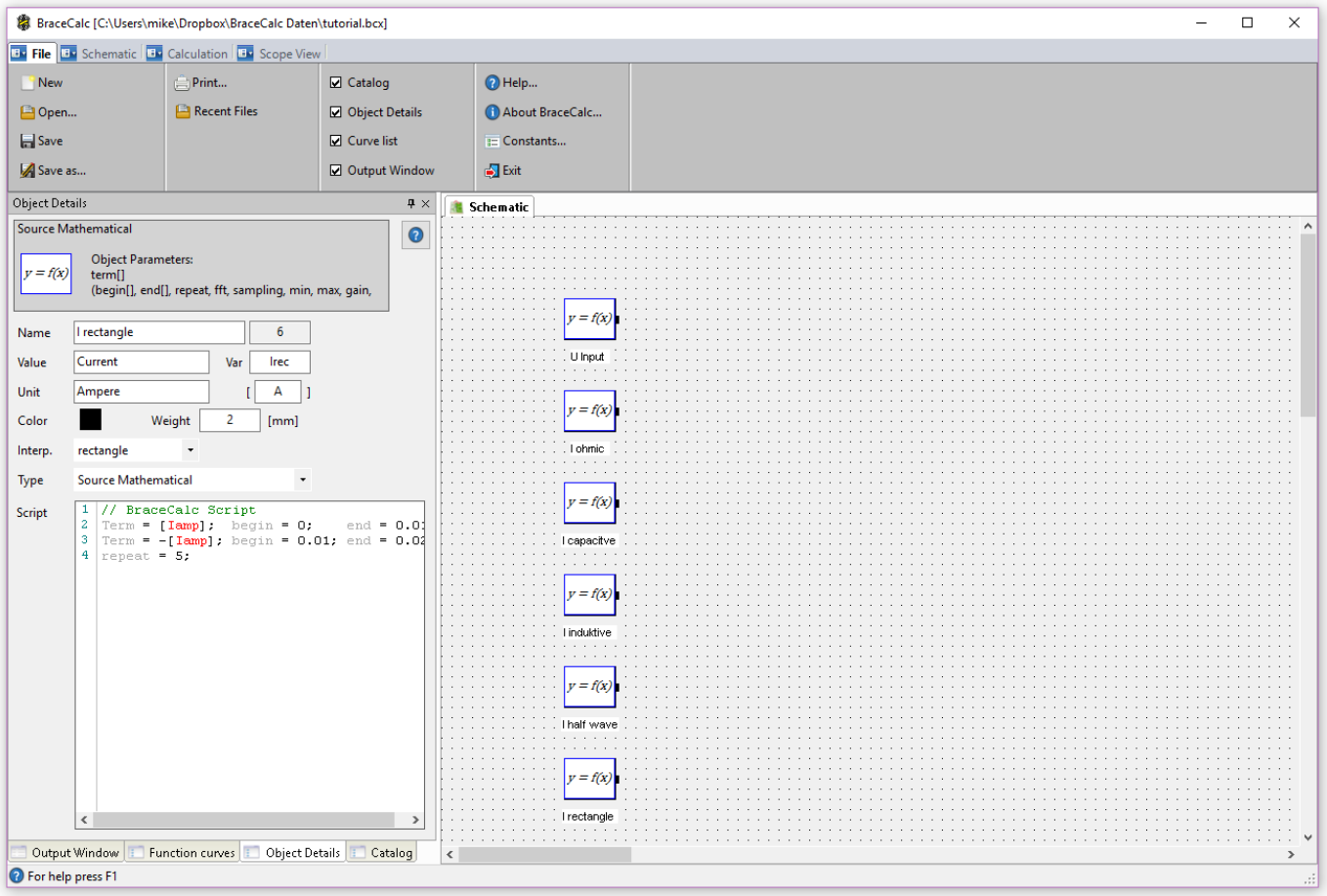


Now we insert the input signal source objects in the schematic.
Use <Schematic><New object> and place the objects one below the other.

Chose the following naming and scripts:

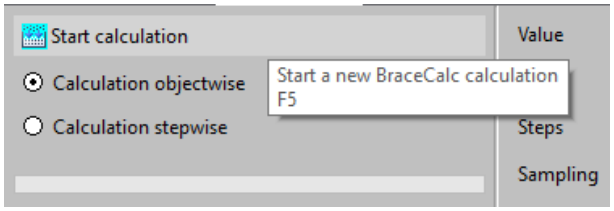
- U Input
```
Term = [Uamp] * sin(50 * t * 2 * [Pi]);
```
- I ohmic
```
Term = [Iamp] * sin(50 * t * 2 * [Pi]);
```
- I capacitive
```
Term = [Iamp] * sin(50 * t * 2 * [Pi] - [PhaseDrift]);
```
- I inductive
```
Term = [Iamp] * sin(50 * t * 2 * [Pi] + [PhaseDrift]);
```
- I halfwave
```
Term = [Iamp] * sin(50 * t * 2 * [Pi]);
Min = 0;
```
- I rectangle
```
Term = [Iamp];  begin = 0;     end = 0.01;
Term = -[Iamp]; begin = 0.01; end = 0.02;
repeat = 5;
```

Save the work with <File><Save>

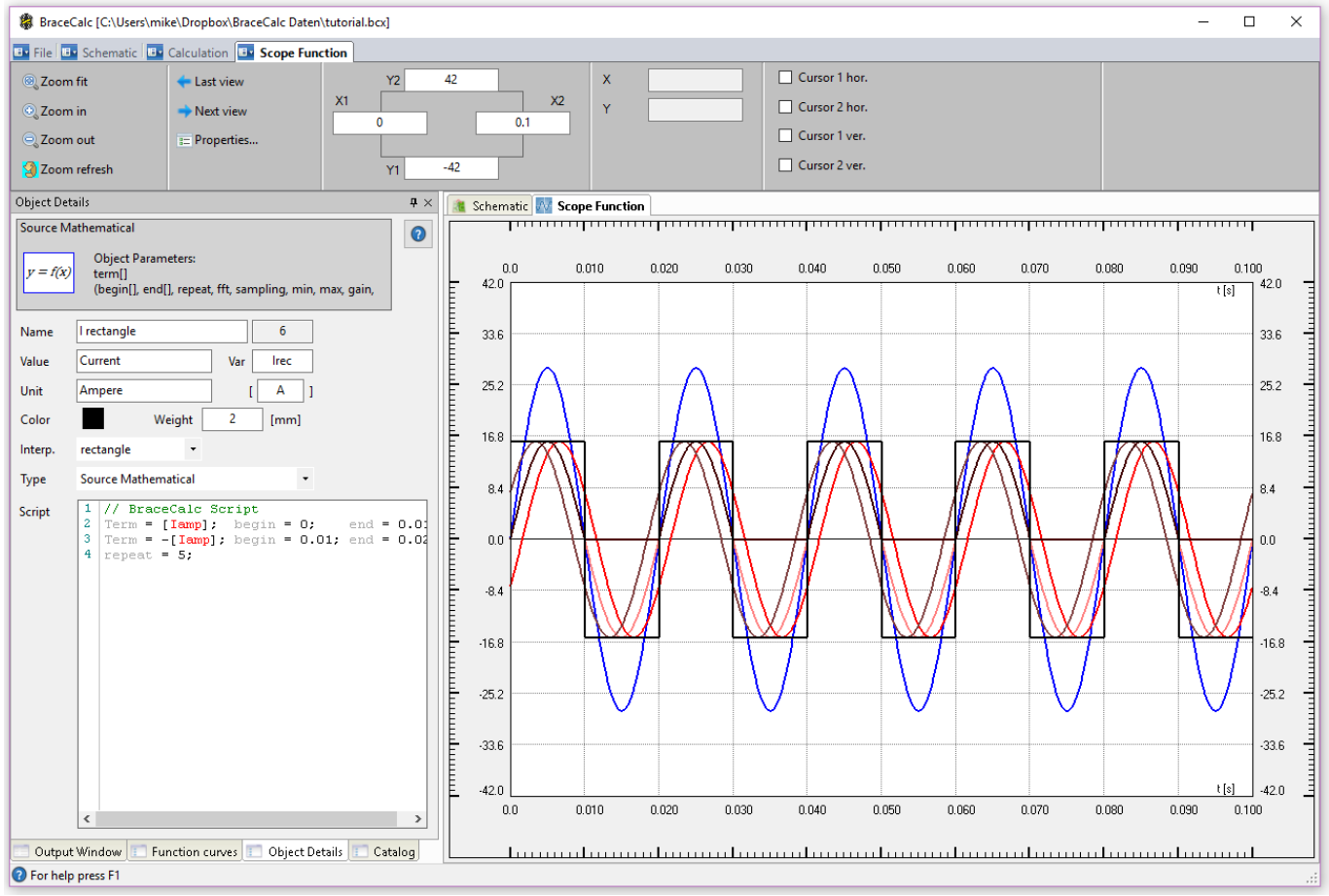


3.5 Source calculation

We execute the first calculations for these input signals.



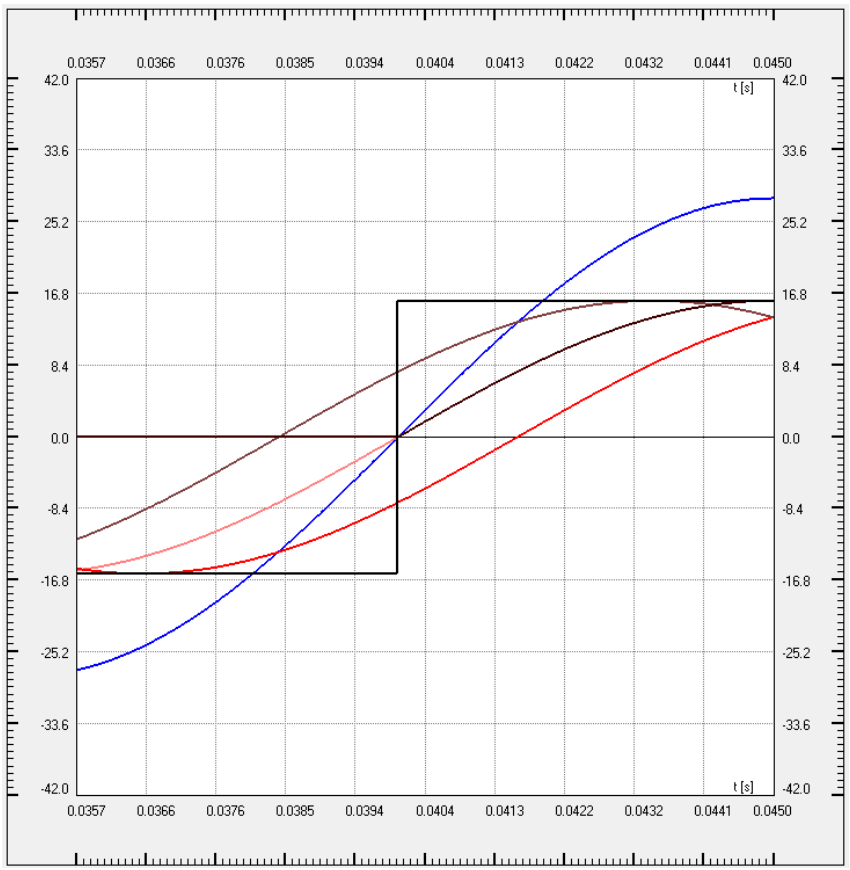
Click on <Start calculation> and change then to the curve view window.



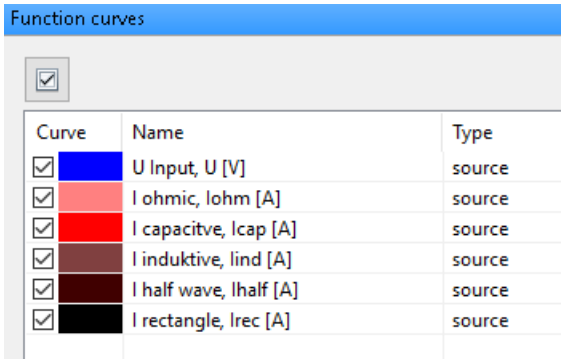
All input signals have been calculated successfully and drown in the scope function window.

3.6 Curve view

Now you can consider the curves in the window and you can zoom to a desired area.



You can visible or fading out every curve in the docking window ´Function curves´.



3.7 Method definitions

3.7.1 Power and energy calculations

Now we want to calculate the power and energy with the voltage and the capacitive current.

Some theory:

Power

$$P(t) = u(t) * i(t)$$

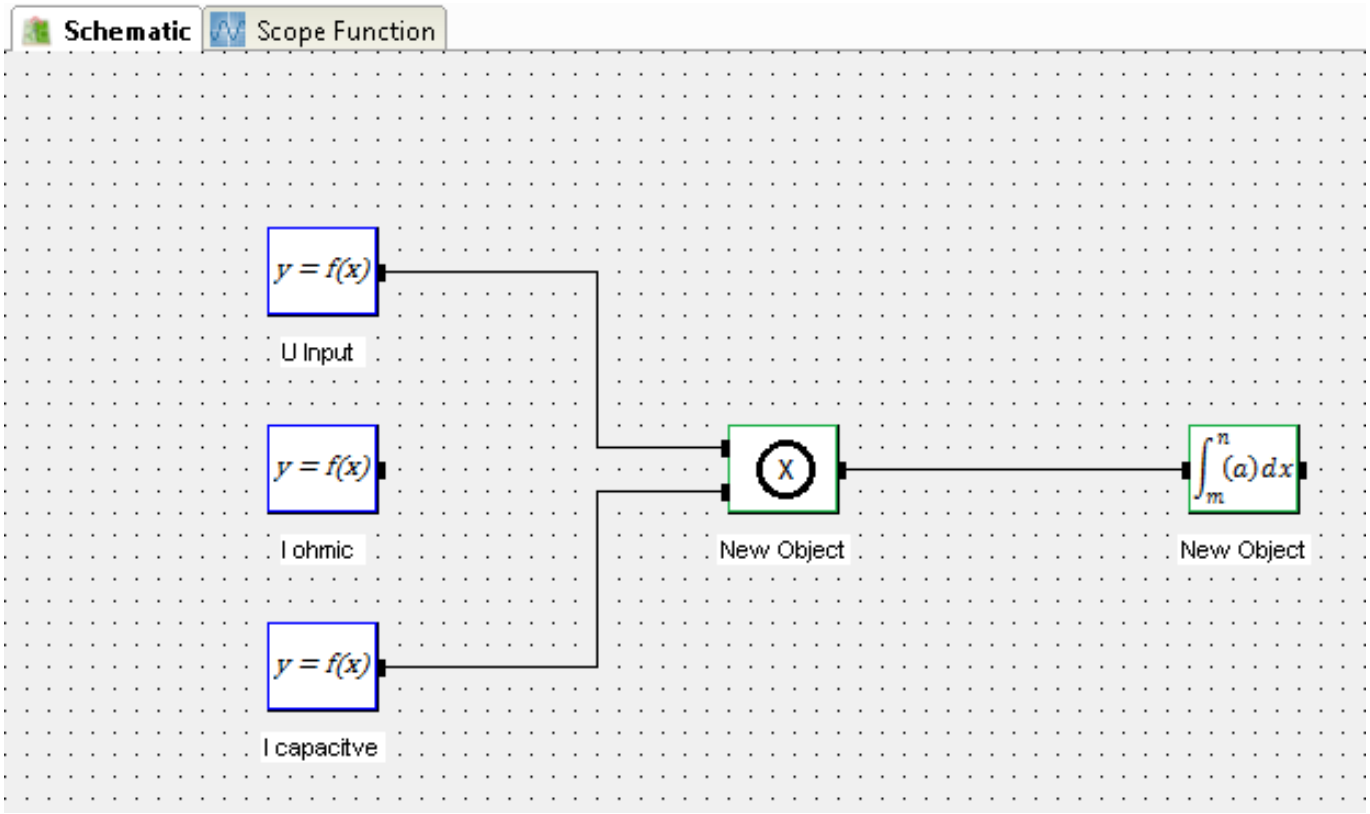
Energy

$$W(t) = \int_{t1}^{t2} P(t)dt = \int_{t1}^{t2} u(t) * i(t) * dt$$

We use the defined time range t_1=0, t_2=0.1

This means that we need a multiplication method and an integral method.

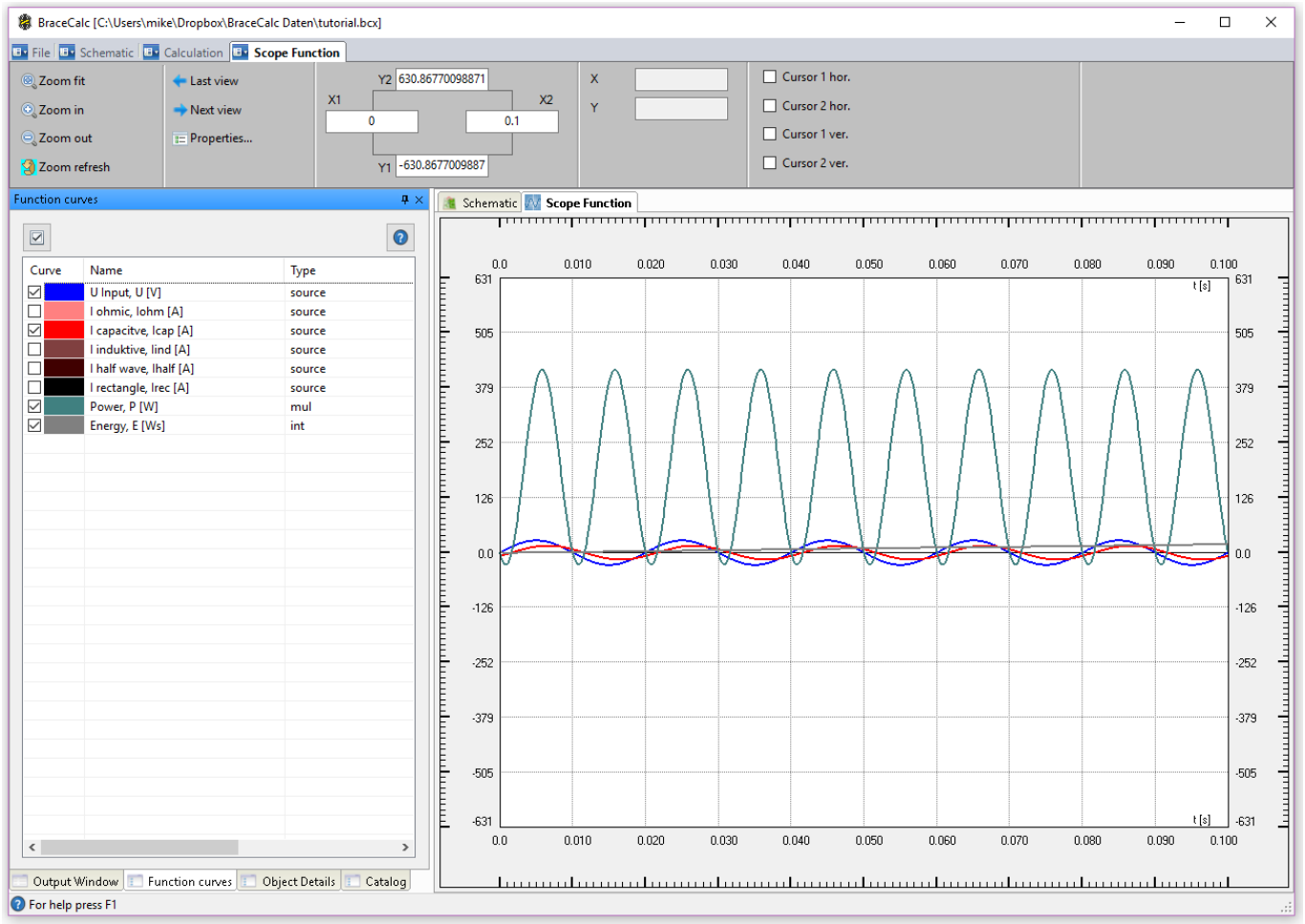
We add these two objects to the schematic and draw the connections with <Schematic><Wire>.



We don't need any scripts for these two objects because the method properties know what is to do.

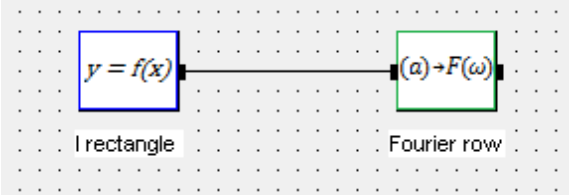
Calculate the new schematic.

Consider the relevant curves with the function curve window.

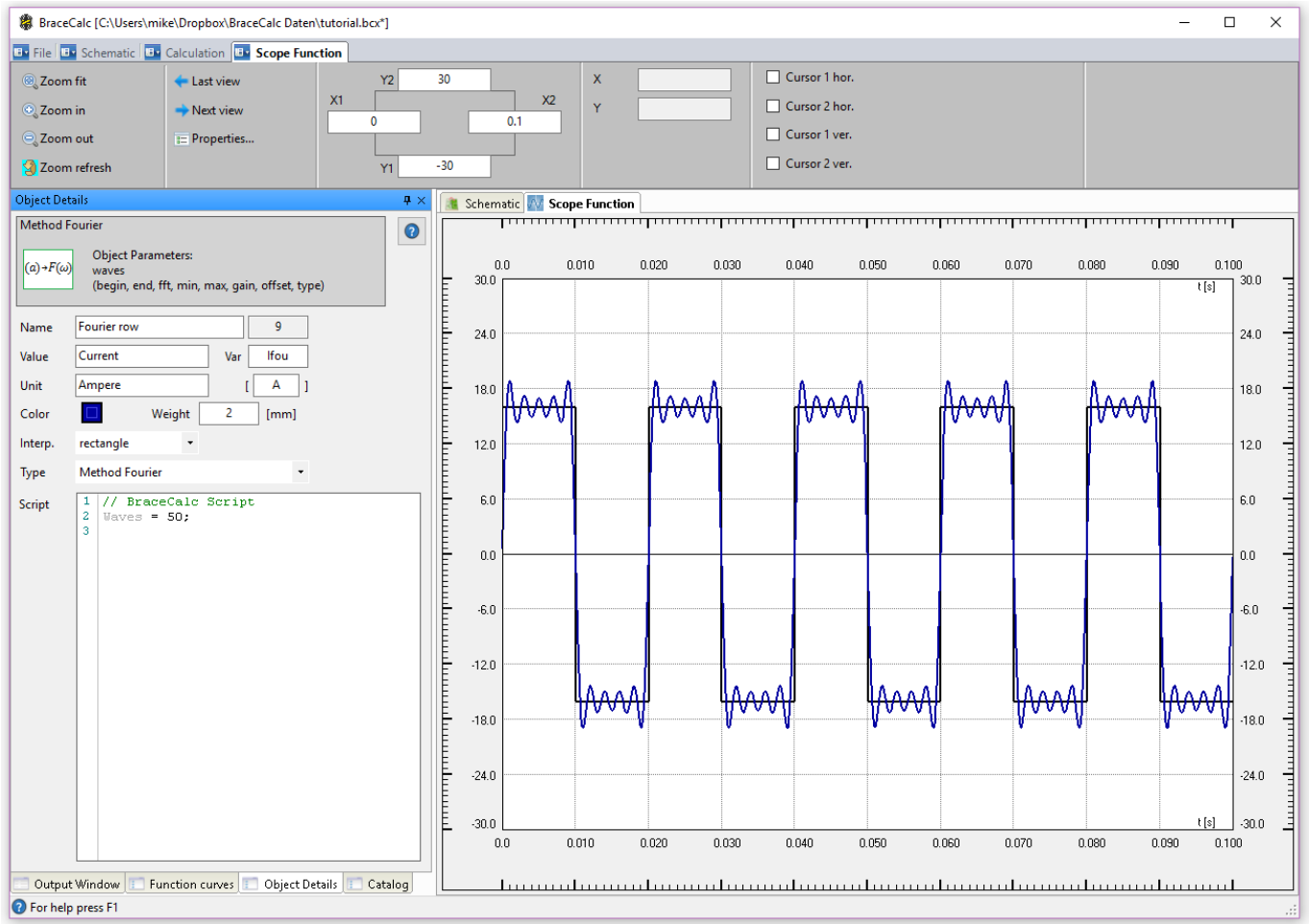


3.7.2 Fourier series

Now we want to calculate the fourier series from the rectangle current.
Use the fourier method.



The fourier method needs the ´waves´ parameter to show the number of the parted waves.



4 Uninstallation

You can uninstall ***BraceCalc*** like the most of other Windows programs.

Go to the Windows system control <Programs uninstall> and search for the ***BraceCalc*** program and uninstall it.

5 Manufacturer Information

Customer support and technical support for ***BraceCalc***:

Eicher Engineering
Software Development
Frigadenstrasse 23
CH-8739 Rieden SG
Switzerland

www.bracecalc.ch
brace@eichereng.ch

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