

Installation of CONCEPT-II

1. Installation of CONCEPT-II for Windows operating systems

- a) Install concept-II-xxx-xxx-64bit-(demo-)setup.exe.
- b) Extend the Path:

C:\CONCEPT-II-12.0(-DEMO)\bin (or wherever the program is installed, here referred to as \$CONCEPT).

Installation under Windows 7 (all figures refer to Windows 7).

For details see Fig 1. Open the 'System' applet in the 'Control panel' (Systemsteuerung).

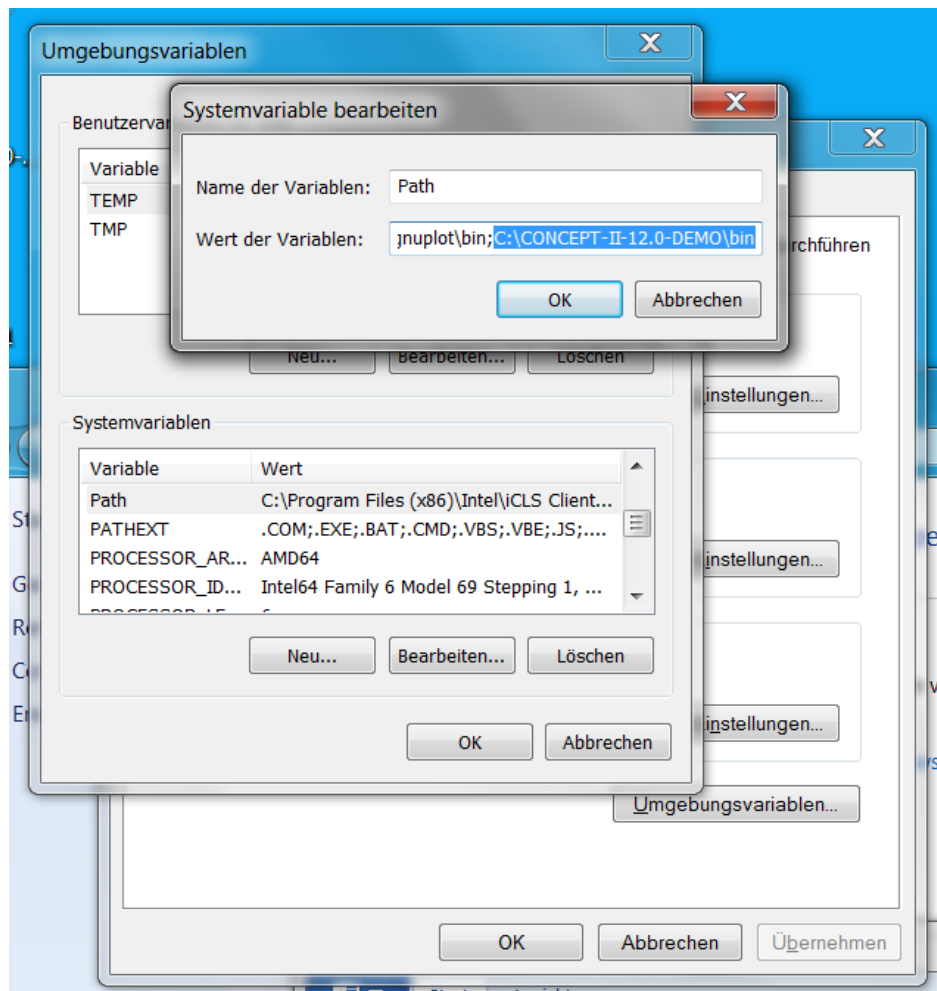


Fig 1: Setting the path to the CONCEPT-II executables (Systemvariablen → System variables, Name der Variablen → Name of variables). For the non-demo version enter C:\CONCEPT-II-12.0\bin

Choose the register 'Advanced' (Erweitert). Click on 'Environment variables' (Umgebungsvariablen).

Select the entry *Path* of 'System variables' (Systemvariablen) and press 'Edit' (Bearbeiten). A sub-window according to Fig 1 opens where *Path* can be completed. Note that *Path* has to be **extended** by a **semicolon followed by the CONCEPT-II path**.

c) Set the environment variable CONCEPT as shown in Fig 2:

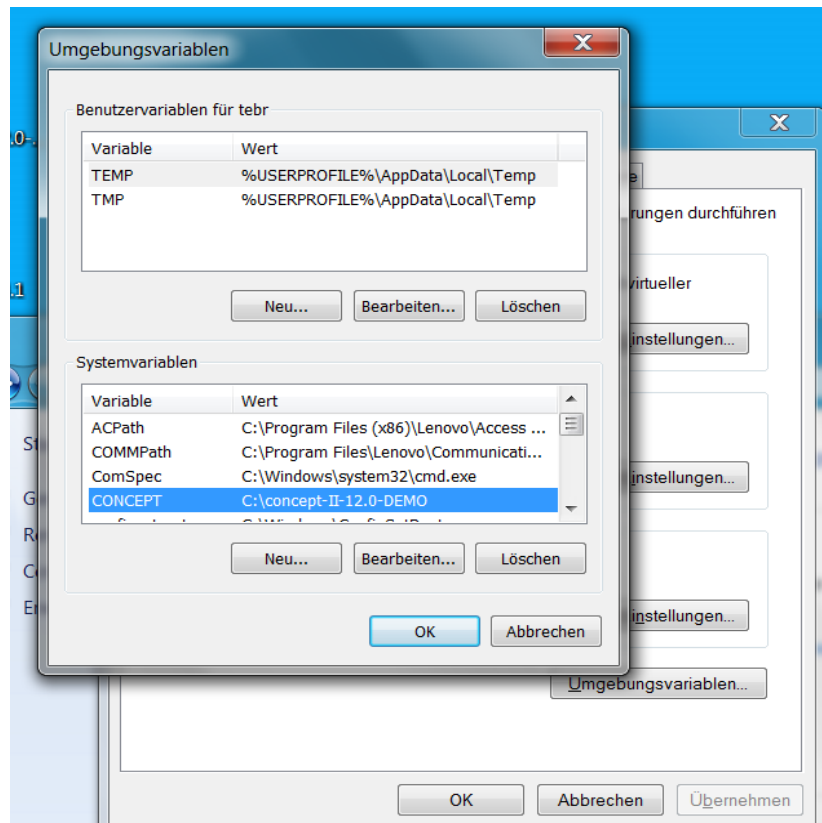


Fig 2: Setting the CONCEPT-II environment variable

Environment variable
Value

CONCEPT
C:\CONCEPT-II-12.0-DEMO

or (normal case)
Value

C:\CONCEPT-II-12.0

Microsoft Windows 10 (German language)

Windows Startbutton (Windows icon unten links) → Einstellungen (Zahnradsymbol) → Unter 'Einstellungen suchen' → 'System' eingeben → 'Systemvariablen bearbeiten' auswählen → Passwort eingeben → Umgebungsvariablen → Variable 'Path' ergänzen → Neu → Pfad eingeben: C:\CONCEPT-II-12.0\bin (oder den Pfad, wo das Programm installiert wurde)

In addition to this set the environment variable CONCEPT

The installation works only properly if all programs that are contained in the directory \$CONCEPT/bin can be called without specifying the complete path. Please do not execute programs under \$CONCEPT/bin. **Copying of executables is not necessary and should not be done!**

d) Multi-processor usage

Default is the usage of OpenMP. The following steps are **only necessary** if MPI shall be applied. MPI has to be used in case MLFMA computations, ACA-based field computations (not available in the demo version) or when using the option "Compute frequency steps parallel".

The *smgd* service has to be started according to Fig 3

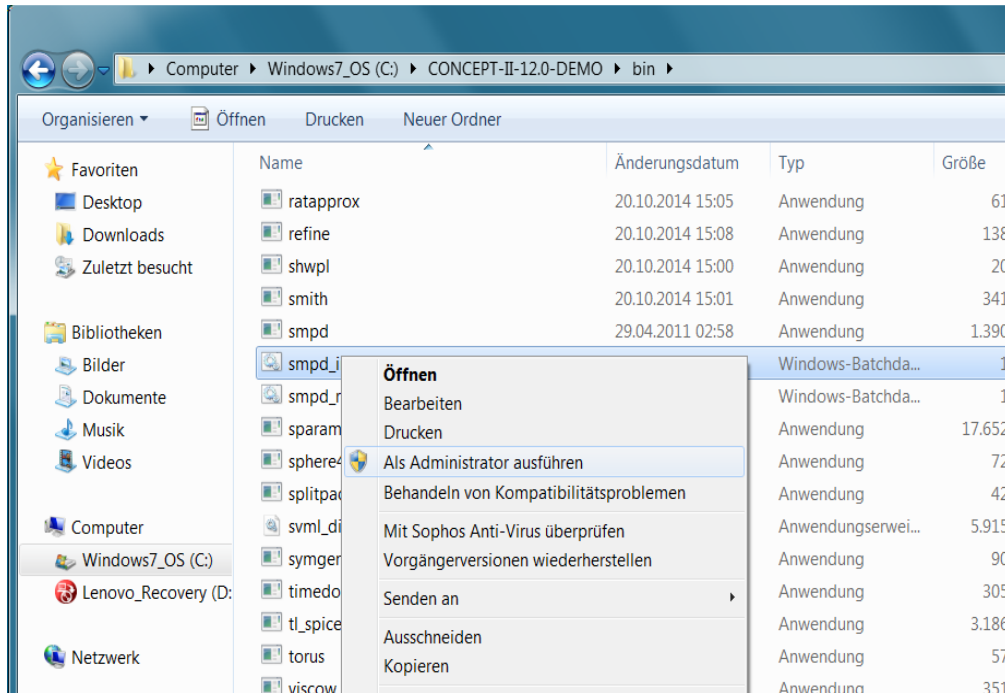


Fig 3: The contents of *CONCEPT-II-12.0(-DEMO)\bin* in the Windows explorer

Execute as system administrator → Als Administrator ausführen

Name: `smpd_install`

Register your credentials using the *wmpiregister* GUI utility; this should be accomplished by each user. The procedure is explained in Fig 4.

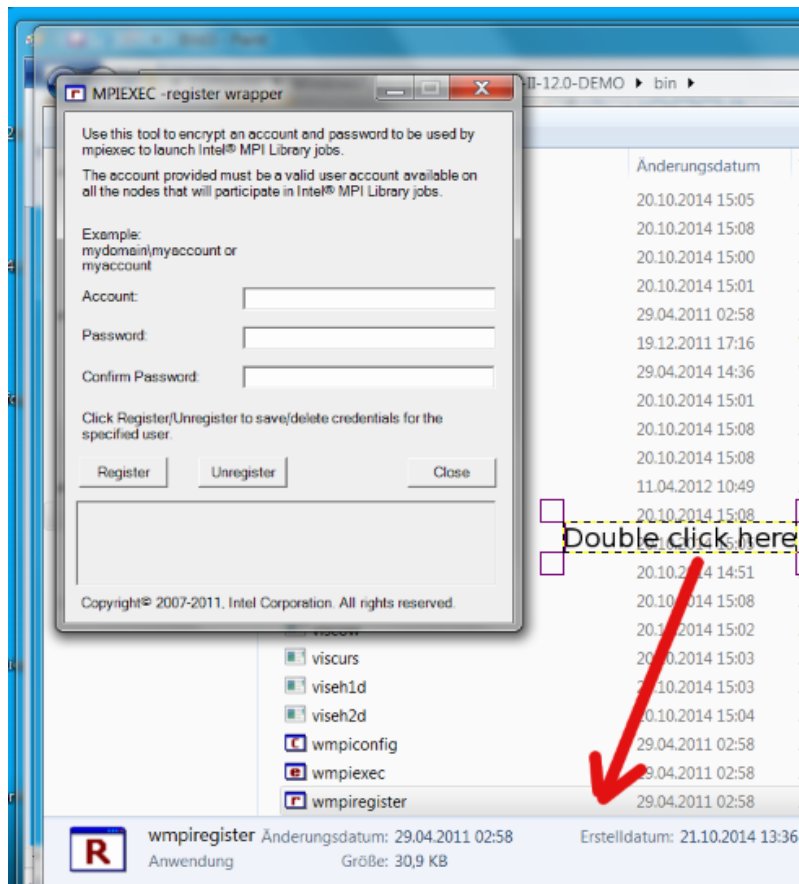


Fig 4: Enabling multi-processor usage

2. Installation of auxiliary software

b) Gnuplot (necessary for the graphical representation of curves)

Download from <http://www.gnuplot.info/>

CONCEPT-II calls the program *gnuplot.exe*. Please extend the variable *Path* by *C:\Programs\gnuplot\bin* (or wherever *gnuplot.exe* is installed). The program must be callable from any working directory.

Last version tested (Oct. 17): gp520-win64-mingw.exe

Pay attention that „Terminal type is now `windows` “ appears as demonstrated in the following figure:

```
C:\Users\concept\Desktop>gnuplot

  G N U P L O T
  Version 5.2 patchlevel 0   last modified 2017-09-01

  Copyright (C) 1986-1993, 1998, 2004, 2007-2017
  Thomas Williams, Colin Kelley and many others

  gnuplot home:      http://www.gnuplot.info
  faq, bugs, etc:   type "help FAQ"
  immediate help:   type "help" (plot window: hit 'h')

Terminal type is now 'windows'
Options are '0 color solid butt enhanced standalone size 1440,760'
Encoding set to 'cp1252'.
gnuplot>
```

a) Ghostscript (necessary for Smith diagrams)

Download from <http://sourceforge.net/projects/ghostscript/files/>

CONCEPT-II calls *gs.exe*. Therefore change the name of the executable file (for instance *gswin32.exe*) to *gs.exe*. Then extend the environment variable *PATH* by *C:\programs\GS\bin* (or wherever *gs.exe* and its *.dll* files are installed).

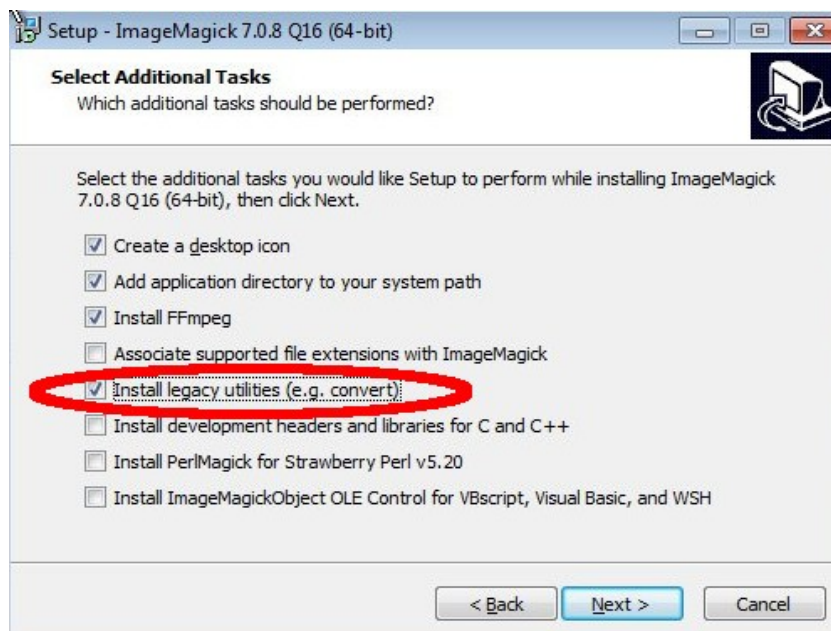


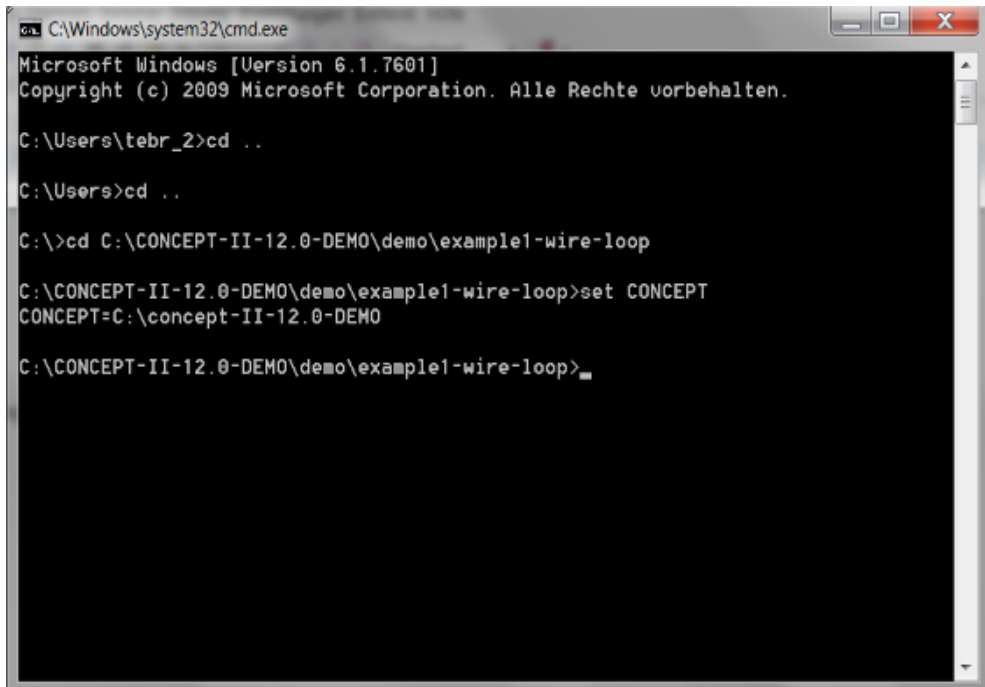
Fig 5: Notice the indicated check mark, has to be active in newer versions of ImageMagick!

b) For creating GIF animations make sure that the ImageMagick software is installed .

Note that only the program *convert.exe* is used. This program has to be enabled as indicated in Fig 5.

3. Test of the installation

Open a command line window (Fig 6):



```
C:\Windows\system32\cmd.exe
Microsoft Windows [Version 6.1.7601]
Copyright (c) 2009 Microsoft Corporation. Alle Rechte vorbehalten.

C:\Users\tebr_2>cd ..
C:\Users>cd ..
C:\>cd C:\CONCEPT-II-12.0-DEMO\demo\example1-wire-loop
C:\CONCEPT-II-12.0-DEMO\demo\example1-wire-loop>set CONCEPT
CONCEPT=C:\concept-II-12.0-DEMO
C:\CONCEPT-II-12.0-DEMO\demo\example1-wire-loop>
```

Fig 6: Test of the CONCEPT-II environment variable, here demonstrated for the demo version.

a) Go to example1-wire-loop as indicated in Fig 6

b) Type

```
set CONCEPT <Enter>
```

The value of the environment variable should appear.

c) In order to find out if the path has been set correctly type

```
concept.exe <Enter>
```

The graphical user interface (GUI) should appear. Close the GUI. If the command *concept.exe* is unknown an error message appears. **Carefully check the path again!**

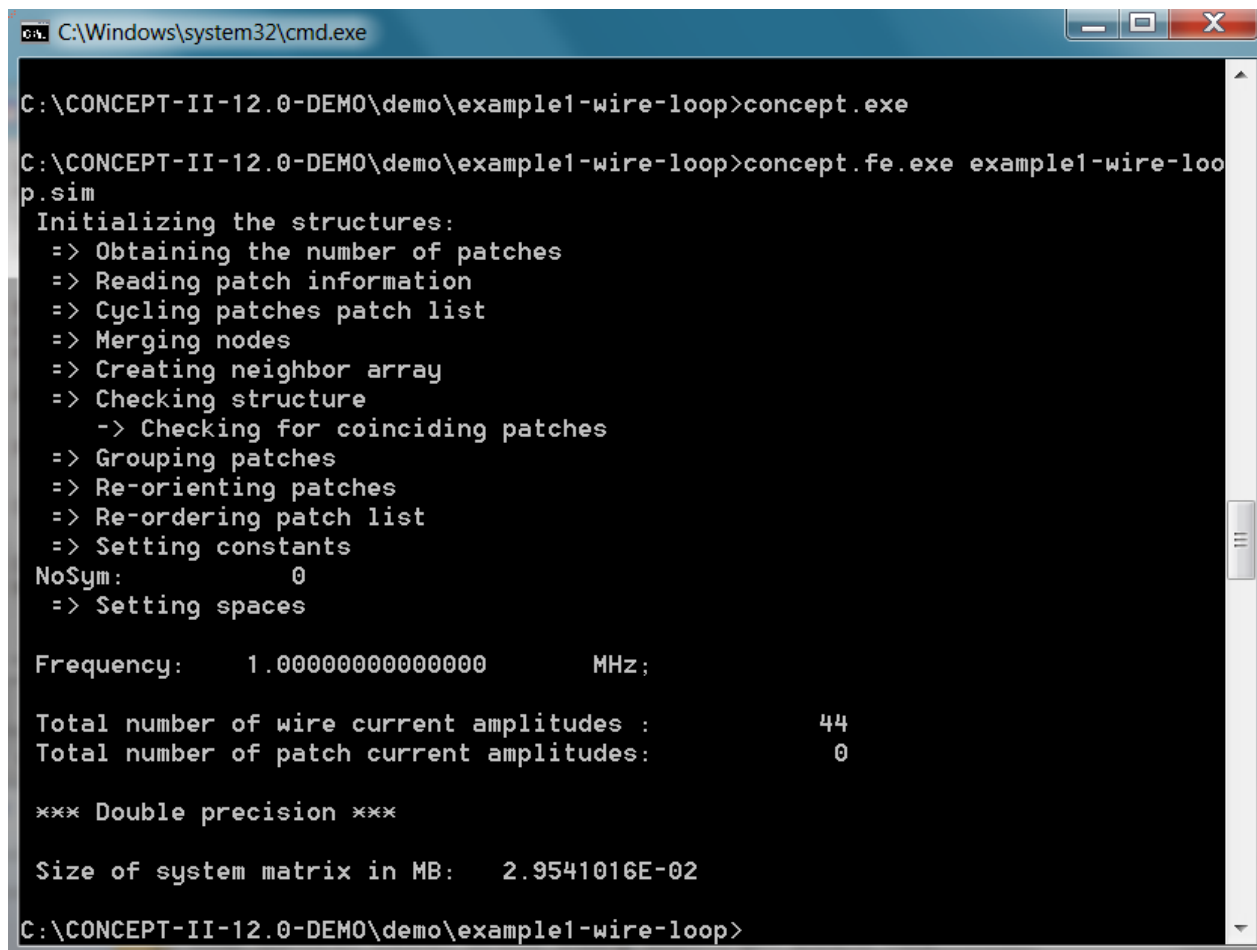
d) Test of the CONCEPT-II front end

Proceed as illustrated in Fig 7.

Type the command

```
concept.fe.exe example1-wire-loop.sim <Enter>
```

Notice the output as shown in Fig 7.



```
C:\Windows\system32\cmd.exe
C:\CONCEPT-II-12.0-DEMO\demo\example1-wire-loop>concept.exe
C:\CONCEPT-II-12.0-DEMO\demo\example1-wire-loop>concept.fe.exe example1-wire-loop.sim
Initializing the structures:
=> Obtaining the number of patches
=> Reading patch information
=> Cycling patches patch list
=> Merging nodes
=> Creating neighbor array
=> Checking structure
    -> Checking for coinciding patches
=> Grouping patches
=> Re-orienting patches
=> Re-ordering patch list
=> Setting constants
NoSym:      0
=> Setting spaces

Frequency:   1.0000000000000000      MHz;

Total number of wire current amplitudes :      44
Total number of patch current amplitudes:      0

*** Double precision ***

Size of system matrix in MB:  2.9541016E-02
C:\CONCEPT-II-12.0-DEMO\demo\example1-wire-loop>
```

Fig 7: Test of the CONCEPT-II front end, here demonstrated for the demo version.

e) Test of the multi-processor environment (only necessary in case on MPI, default is OpenMP)

Type at the command line:

```
mpiexec -delegate -np 2 concept.be.exe <Enter>
```

Expected message in the command line window at the end:

CONCEPT-II back end terminates normally.

In case of the following message:

Error while connecting to host. ...

smpd_install has not been properly carried out. Another problem could be that smpd has been activated by another program.

f) Test of gnuplot

Type

gnuplot.exe <Enter>

at the command line. The gnuplot window appears. If not, the *Path* has not been specified properly.

g) Test gs.exe

Type

gs.exe <Enter>

at the command line. In case of problems check the *Path* and/or rename the *gsxxx.exe* to *gs.exe* with xxx as the version number.

In case of the following problem:

- Hovering the mouse pointer over a node of a patch should give the corresponding coordinates in the info line under the display area. If this does happen the OpenGL driver of the graphics card might not be OK. Please check for an appropriate version.