Installation of Elmer

Obtaining the source, compiling, installing and setting up the system

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The Finnish IT center for science

Espoo, Finland

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The Source of Elmer

- Elmer is available either as **binary**:
  Win32 (SourceForge or Funet†), Ubuntu/Linux (Funet)

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- or as **source** ($\sim$ 300k lines of code) from either Funet, SourceForge as download or using subversion

```
svn co https://elmerfem.svn.sourceforge.net/svnroot/elmerfem
elmerfem
```

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elmerfem
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  - − compiling needs patience and endurance
  - \+ easy update, code is best documentation, customisation

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Binary on Ubuntu/Linux

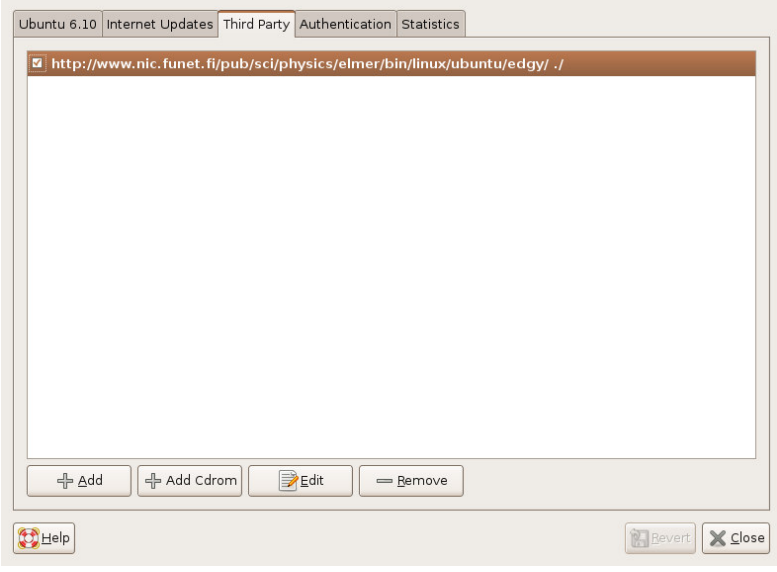
In **Synaptic Package Manager**:

- open menu **Settings**$\longrightarrow$**Repositories**

Binary on Ubuntu/Linux

In **Synaptic Package Manager**:

- open menu **Settings**→**Repositories**
- choose **+Add** and add the Funet-server



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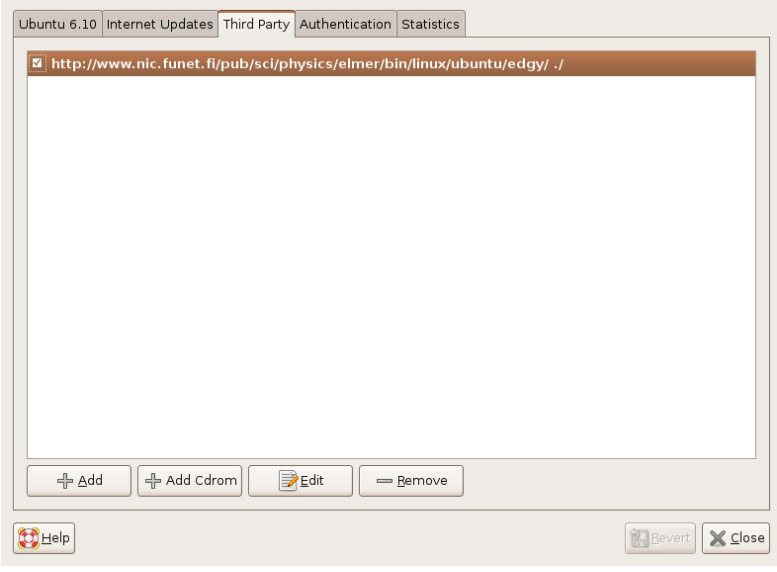

- then **Search** for keyword *elmer* and toggle to add

Binary on Win32

http://www.csc.fi/english/pages/elmer/download/quickstart/index_htm

- download the installer from SourceForge

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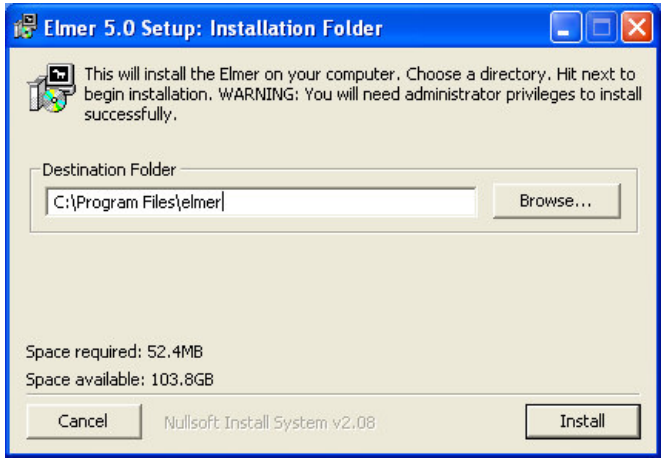
- double-click the installer - define directory:



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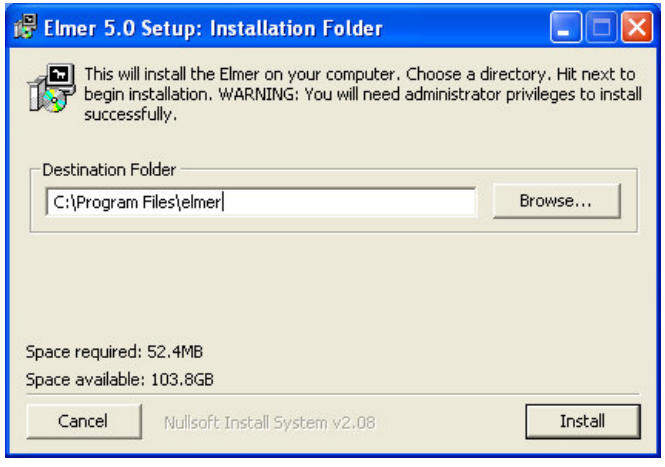

- executables are then called from **Start→All Programs→Accessories→Command prompt**

What Binaries?

ElmerSolver FEM Solver with all the nice features built in (parallel version ElmerSolver_mpi). The different applications (like Navier-Stokes, Heat Transfer, ...) are dynamically linked libraries (`.dll`, `.so`)

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ViewFactors	computation of view factors

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Funet FTP

http://www.nic.funet.fi/pub/sci/physics/elmer/

ftp://ftp.nic.funet.fi/pub/sci/physics/elmer/

Index of /pub/sci/physics/elmer

Name	Last modified	Size	Description
Parent Directory		-	
bin/	15-May-2007 10:15	-	
doc/	09-Jan-2008 16:43	-	
src/	28-Sep-2007 14:30	-	
README	13-Feb-2007 12:31	865	

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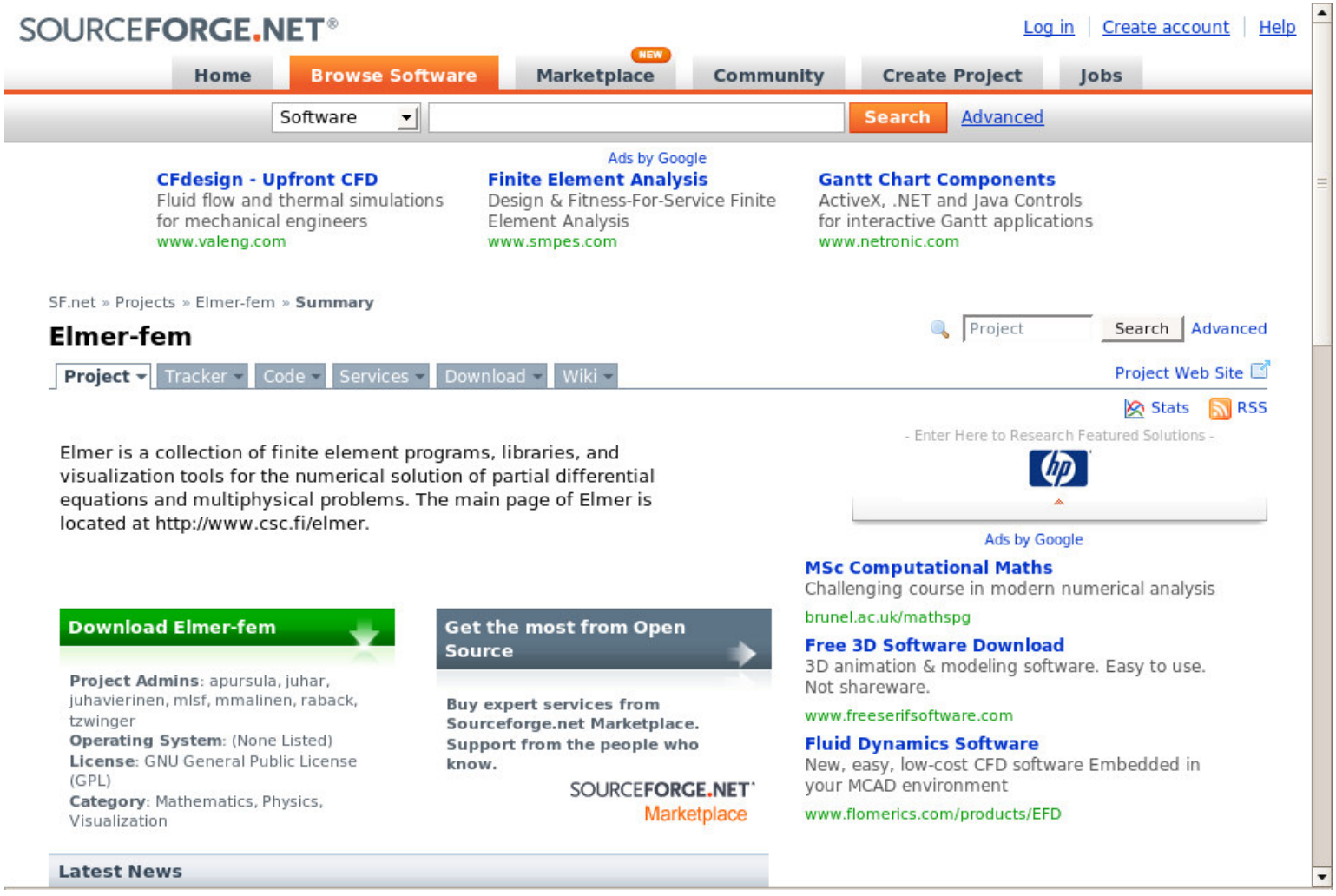
SourceForge SVN

http://sourceforge.net/projects/elmerfem/



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mathlibs	contains basic mathematical libraries such as Lapack, Blas, Arpack, and Parpack
hutiter	source for iterative linear algebra solvers called by ElmerSolver (mostly F90)
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doc	the LaTeX -based documentation input files
elmer-doc	help documents of Elmer

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- Optional:

1. for parallel version MPI library (like OpenMPI) and Hypre
2. ffmpeg and libjpeg to use the MPEG/JPEG plug-in in ElmerPost

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UNIX/Linux

```
#!/bin/sh -f
#the compiler (here the gcc 4.X suite)
export CC=gcc
export CXX=g++
export FC=gfortran
export F77=gfortran
#the compiler flags
export CFLAGS=""
export CXXFLAGS=""
export FCFLAGS=""
export F77FLAGS=""
export FFLAGS=""
#linking
export LDFLAGS=""
#paths
export ELMER_HOME="/path/to/Elmerdir"
```

UNIX/Linux contd.

```
# make the modules
modules="matc umfpack mathlibs elmergrid meshgen2d eio hutiter
fem post"
# configure and build
for m in $modules; do
cd $m ; ./configure --prefix=$ELMER_HOME && make clean && make
&& make install && cd ..
done
```

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- Additional arguments for configure:
  - debugging build: `--with-debug`
  - 32-bit platform: `-with-64bits=no`

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for m in $modules; do
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```

- Additional arguments for configure:
  - debugging build: `--with-debug`
  - 32-bit platform: `-with-64bits=no`
- adapt the paths in the script above to match your system!
- save it into `compile.sh` in the root of the source-tree
- run the compilation `./compile.sh`

UNIX/Linux parallel MPI

- compile and install a MPI library; e.g. OpenMPI

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UNIX/Linux parallel MPI

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```
#!/bin/sh -f
#the OpenMPI wrapper
export CC=mpicc
export CXX=mpic++
export FC=mpif90
export F77=mpif90
#the compiler flags
export CFLAGS="-I/usr/local/hypre2.0/include"
export FCFLAGS="-I/usr/local/hypre2.0/include"
export F77FLAGS="-I/usr/local/hypre2.0/include"
export FFLAGS="-I/usr/local/hypre2.0/include"
#linking needs Hypre included
export LDFLAGS="L/usr/local/hypre2.0/lib -lHYPRE"
```

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UNIX/Linux parallel MPI contd.

```
#paths; linking needs Hyper and MPI
export ELMER_HOME="/path/to/Elmerdir"
export LD_LIBRARY_PATH="/usr/local/OpenMPI/lib:$LD_LIBRARY_PATH"
export LD_LIBRARY_PATH="/usr/local/hypre2.0/lib:$LD_LIBRARY_PATH"
# make the modules
modules="matc umfpack mathlibs elmergrid meshgen2d eio hutiter
fem post"
# configure and build
for m in $modules; do
cd $m ; ./configure --prefix=$ELMER_HOME
--with-mpi-dir=$MPI_HOME && make clean && make && make install
&& cd ..
done
```

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Win32 using MinGw and g95†

- Get the installer MinGW-5.1.3.exe from SourceForge and run it
  Install the ”current” version
  Choose all possible packages to download and install
  Install in `C:\MinGW`

† Contribution by Mikko Lyly

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- Get the installer MinGW-5.1.3.exe from SourceForge and run it
  Install the ”current” version
  Choose all possible packages to download and install
  Install in `C:\MinGW`
- Get the installer MSYS-1.0.10.exe and run it
  Install in `C:\msys\1.0`

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  Install in `C:\MinGW`
- Get the installer MSYS-1.0.10.exe and run it
  Install in `C:\msys\1.0`
- Get the installer msysDTK-1.0.1.exe and run it

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- Get the installer MSYS-1.0.10.exe and run it
  Install in `C:\msys\1.0`
- Get the installer msysDTK-1.0.1.exe and run it
- Download the GCC 4 packages of MinGW
  the contents of these packages in /mingw:

```
gcc-core-4.2.1-sjlj-2.tar.gz
gcc-g++-4.2.1-sjlj-2.tar.gz
gcc-gfortran-4.2.1-sjlj-2.tar.gz
```

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Win32 using MinGw and g95 contd.

- Download and run the installer g95-MinGW.exe for g95
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Win32 using MinGw and g95 contd.

- Download and run the installer g95-MinGW.exe for g95 (mind: g95 $\neq$ gfortran)
- Let the installer extract its content into the MinGW structure
- test your compiler:

```
 $ cat > test.c
/* test.c */
#include <stdio.h>
int main() {
fprintf(stdout,"It works!");
}
<CTRL-D>
$ gcc-sjlj -O -o test.exe test.c
$ ./test.exe
It works!
⋮
```

Win32 using MinGw and g95 contd.

- Download and run the installer g95-MinGW.exe for g95 (mind: g95 $\neq$ gfortran)
- Let the installer extract its content into the MinGW structure
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$ ./test.exe
It works!
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```

- also test your fortran compiler!

Win32 using MinGw and g95 contd.

```
#!/bin/sh
export ELMER_HOME=/c/Elmer5.4
export CC=gcc
export CXX=g++
export FC=g95
export F77=g95
export LDFLAGS="-L/mingw/lib/gcc/mingw32/3.4.5/ -Xlinker
--stack=1000000000 "
modules="matc umfpack mathlibs elmergrid meshgen2d eio hutiter
fem"
for m in $modules; do
cd $m
./configure --prefix=$ELMER_HOME
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Elmer Web

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Suomeksi

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- Application examples
- Interfaces
- White papers
- Mailing lists
- Links
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- Services and contact

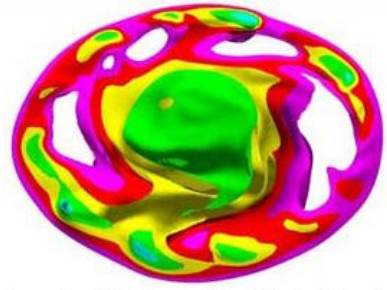
Elmer

Tämä sivu suomeksi

Open Source Finite Element Software for Multiphysical Problems

Elmer is an open source multiphysical simulation software developed by CSC. Elmer development was started 1995 in collaboration with Finnish Universities, research institutes and industry.

Elmer includes physical models of fluid dynamics, structural mechanics, electromagnetics, heat transfer and acoustics, for example. These are described by partial differential equations which Elmer solves by the Finite Element Method (FEM).



Temperature distribution of melt flow in Czochralski growth of silicon.

These pages are intended to give information on the Elmer software and to improve the information transfer in the Elmer community.

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Done

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