

Elmer WSL Debian 12 with Elmer Virtual Machine Scripts

This WSL distribution is built using Elmer Virtual Machine Scripts.

Faster than VirtualBox (tests were finished in short time)

Function turned off

GridDataReader: The purpose of this library is unknown.

OCC (Geometry viewer): This is the geometry viewer for OpenCASCADE Community Edition.

VTK(ElmerVTK): This is Elmer's visualization toolkit.

How to use

Commands: "ElmerSolver", "ElmerGrid", "ElmerGUI", "paraview"

The username for the WSL is "elmeruser" and the password "elmerfem".

I recommend changing the password using the "passwd" command.

Confirmed solution methods

- BiCGStab worked.

- MUMPS worked in both single and parallel modes.

- Pardiso (single) worked.

- CPardiso (parallel) did not work.

Import methods

Step 1: Import a Linux Distribution

Open a command prompt or PowerShell window.

Run the following command to import the desired Linux distribution (replace elmer_debian12 with your preferred name and adjust the paths accordingly):

```
wsl --import elmer_debian12 c:\elmer_debian12 .\ ElmerWSL_with_ElmerVM_Scripts.tar
(¥ means backslash)
```

For more details, you can refer to the official documentation: Use Custom Distro with WSL.
<https://learn.microsoft.com/en-us/windows/wsl/tom-distro>

Step 2: Change User (from root to elmeruser)

Edit the /etc/wsl.conf file within Elmer Debian WSL distribution.

Add the following section to set the default user to elmeruser:

```
[user]
default=elmeruser
```

Result of operation check

```
*****
```

```
MAIN: ElmerSolver finite element software, Welcome!
MAIN: This program is free software licensed under (L)GPL
MAIN: Copyright 1st April 1995 - , CSC - IT Center for Science Ltd.
MAIN: Webpage http://www.csc.fi/elmer, Email elmeradm@csc.fi
MAIN: Version: 9.0 (Rev: cb820fb2b, Compiled: 2024-03-21)
MAIN:  Running one task without MPI parallelization.
MAIN:  Running with just one thread per task.
MAIN:  HYPRE library linked in.
MAIN:  MUMPS library linked in.
MAIN:  MMG library linked in.
MAIN:  ParMMG library linked in.
MAIN:  Intel MKL linked in.
MAIN:  Lua interpreter linked in.
MAIN:  Zoltan library linked in.
```

```
*****
```

97% tests passed, 11 tests failed out of 392

Label Time Summary:

```
aster          = 2.50 sec*proc (1 test)
block          = 31.50 sec*proc (11 tests)
```

cmodes	= 15.96 sec*proc (6 tests)
contact	= 7.36 sec*proc (3 tests)
control	= 22.25 sec*proc (9 tests)
eigen	= 2.65 sec*proc (1 test)
elasticity	= 7.42 sec*proc (3 tests)
elasticsolve	= 22.77 sec*proc (9 tests)
eliminate	= 2.38 sec*proc (1 test)
em-wave	= 5.37 sec*proc (2 tests)
extrude	= 9.42 sec*proc (4 tests)
fsi	= 2.62 sec*proc (1 test)
harmonic	= 7.87 sec*proc (3 tests)
heateq	= 20.12 sec*proc (8 tests)
helmholtz	= 12.16 sec*proc (5 tests)
lua	= 23.03 sec*proc (8 tests)
lumping	= 13.88 sec*proc (5 tests)
matc	= 44.60 sec*proc (17 tests)
mortar	= 22.96 sec*proc (9 tests)
n-t	= 17.75 sec*proc (7 tests)
namespace	= 14.13 sec*proc (5 tests)
p-fem	= 26.21 sec*proc (9 tests)
parallel	= 3.42 sec*proc (4 tests)
particle	= 10.18 sec*proc (4 tests)
plate	= 10.04 sec*proc (4 tests)
quick	= 1035.69 sec*proc (392 tests)
radiator	= 7.94 sec*proc (3 tests)
restart	= 2.89 sec*proc (1 test)
serendipity	= 48.40 sec*proc (17 tests)
serial	= 1032.27 sec*proc (388 tests)
shell	= 16.04 sec*proc (6 tests)
transient	= 36.99 sec*proc (14 tests)
umat	= 7.42 sec*proc (3 tests)
useextrude	= 33.65 sec*proc (13 tests)
vector_element	= 33.84 sec*proc (12 tests)
vtu	= 7.36 sec*proc (3 tests)
whitney	= 23.53 sec*proc (9 tests)

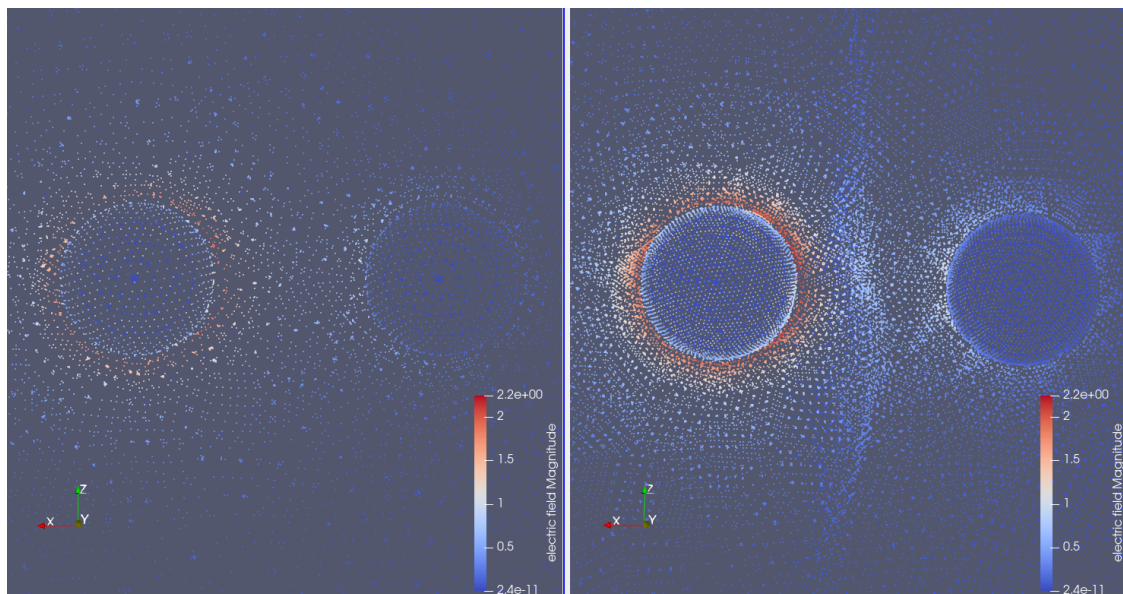
Total Test time (real) = 65.66 sec

The following tests FAILED:

- 222 - EMWaveBoxHexasEigen (Failed)
- 249 - ElementUnitTest_edge_quadratic (Failed)
- 325 - InductionHeating2 (Failed)
- 567 - SecondOrderEdgeElement2D_BCs (Failed)
- 902 - radiation (Failed)
- 903 - radiation2 (Failed)
- 910 - radiation_bin (Failed)
- 911 - radiation_dg (Failed)
- 913 - radiator3d (Failed)
- 914 - radiator3d_box (Failed)
- 919 - radiator3d_symm (Failed)

MMG function was checked CapacitanceOfTwoBallsH.

<https://github.com/ElmerCSC/elmer-linsys/tree/main/Electrostatics/CapacitanceOfTwoBallsH>



tutorials-GUI-files/CapacitanceOfTwoBalls

Electrostatics/CapacitanceOfTwoBallsH

Appendix

1. Why use Debian 12

When updating the “Elmer Virtual Machine based on Ubuntu 22.04” using the command “sudo apt update && sudo apt full-upgrade”, the terminal displays the following message: “Get more security updates through Ubuntu Pro with ‘esm-apps’ enabled: …”.

- Ubuntu Pro costs \$500.00 for commercial use. However, there is a free personal subscription available for 5 machines (for you or any business you own), or 50 machines for active Ubuntu Community members.
- I appreciate Debian’s philosophy of being “freely available for everyone”.

2. CPardiso Configuration

CPardiso is not available when compiled by buildelmer.sh.

If you run the following cmake manually, CPardiso will probably work.

```
cmake      -DWITH_QT5=TRUE      -DWITH_ELMERGUI:BOOL=TRUE      -
DWITH_MPI:BOOLEAN=TRUE          -DWITH_Mumps:BOOL=TRUE          -
DWITH_LUA:BOOL=TRUE             -DWITH_MKL:BOOL=TRUE             -
DWITH_Hypre:BOOL=TRUE   -DHypre_INCLUDE_DIR="/usr/include/hypre"   -
DWITH_PARAVIEW:BOOL=TRUE   -DWITH_OpenMP:BOOLEAN=TRUE   -
DWITH_ElmerIce:BOOLEAN=TRUE                                           -
DCMAKE_INSTALL_PREFIX=../install ../elmerfem
```