Compile ISAT-FFD in Windows

# 1 Needed Libs and Their Usages

* SELL: contained in the ISAT package, which is dependency for ISAT.lib
* ELL: contained in the ISAT package, which is dependency for ISAT.lib
* ISAT: main table used to interact with FFD
* ADIFOR: a FORTRAN 77 library to solve automatically the differentiation. <http://www.mcs.anl.gov/research/projects/adifor/>
* CHEMKIN: if for chemical kinetic problems, it is necessary. Otherwise, omit it. <https://www.google.com/webhp?sourceid=chrome-instant&ion=1&espv=2&ie=UTF-8#q=chemkin>
* CHEMKIN EXTENSIONS: if for chemical kinetic problems, it is necessary. Otherwise, omit it.
* LAPACK: linear equations solver, which may be needed for ISAT to realize some advanced functions. It is already in Intel Parallel Studio XE 2016 package.

# 2 Install the Visual Studio

* If VS2010 is used:

First install Windows SDK 7.1: <https://www.microsoft.com/en-us/download/details.aspx?id=8279>

This is to install the C++ library for X64 architecture, which is required by the Intel Parallel Studio

Then go to the Step 3.

* If VS2013 EXPRESS is used:

First, uninstall everything related to VS 2013 EXPRESS.

* If VS2013 version other than EXPRESS (Professional, Ultimate, etc. ) is used:

First, check if C++ compiler for X64 is there. Go to start->Visual Studio 2013->Tools

If yes, go to Step 3. Otherwise, reinstall and repair the problem.

* VS 2015 community edition is recommended. The program is free and can be downloaded at <https://www.visualstudio.com/en-us/products/visual-studio-community-vs.aspx>

First, download installation file and double click it.

Second, when installing the program, DO NOT use default settings. Instead use customized settings to enable installing the C++ tools and compilers, which is NECESSARY for installing Intel Parallel Studio.

Reference: <https://software.intel.com/en-us/forums/intel-visual-fortran-compiler-for-windows/topic/590621>

# 3 Install Intel Parallel Studio Composer XE 2016 to obtain C++ and Fortran Libs

* Intel Parallel Studio COMPOSER/CLUSTER XE 2016
  + The download address is here: <https://software.intel.com/en-us/intel-parallel-studio-xe#pid-3191-835>
  + There is student version license which is free. <https://software.intel.com/en-us/qualify-for-free-software/student>
  + Downloaded the installation file and HOLD.
* Intel Parallel Studio COMPOSER/CLUSTER XE 2013
  + NOT AVAILABLE ANY LONGER
* Installation of Intel Parallel Studio
  + If using VS 2015, then simply double click and follow the wizard.
  + If using VS 2013 EXPRESS, then install Windows SDK 8.1 for Windows first. <https://software.intel.com/en-us/vs2013shell-windowssdk> . After that Intel Fortran will be integrated into VS 2013 SHELL, which is in PROFESSIONAL version. Only 30 day trial is free of charge. After installation of Intel Parallel Studio is done, then install Visual Studio 2013 EXPRESS. Address is here: <https://www.visualstudio.com/downloads/download-visual-studio-vs>
  + If using VS 2013 version other than EXPRESS, then simply double click and follow the wizard.

# 4 Compile ISAT.lib on Windows

* Create a new project and choose “Intel(R) Visual Fortran->Library->Static Library”
* Add existing items with source files in the following three folders, which can be found in <https://github.com/doetools/isat_ffd/tree/master/src/isat>
  + ell\_lib
  + isatal\_ser
  + sell\_lib
* Build and succeed!

# 5 Compile ISAT-FFD-GPU.exe on Windows

* Create a new project and choose “Visual C++->Win32->Win32 Console Application->Console application”
* Add existing items with ISAT-FFD-GPU source codes, which can be found in <https://github.com/doetools/isat_ffd/tree/master/src/ffd_isat>
* Configuration Properties->VC++ Directories->Library Directories->
  + C:\Program Files (x86)\Intel\Composer XE 2013\mkl\lib\ia32 OR
  + C:\Program Files (x86)\IntelSWTools\compilers\_and\_libraries\_2016.2.180\windows\compiler\lib\ia32\_win
* Configuration Properties->VC++ Directories->Library Directories-> path of other libs, such as ISAT.lib
* Configuration Properties->Linker->General->Additional Library Directories->
  + C:\Program Files (x86)\Intel\Composer XE 2013\mkl\lib\ia32 OR
  + C:\Program Files %28x86%29\IntelSWTools\compilers\_and\_libraries\_2016.2.180\windows\mkl\lib\ia32\_win
* Configuration Properties->Linker->Input->Additional Dependencies-> ISAT.lib; ifconsol.lib; opencl.lib (name of lib)
* Build and succeed!

# 6 Run program ISAT-FFD-GPU

* Running in visual studio
  + Configuration Properties->VC++ Directories->Library Directories-> C:\Program Files (x86)\Intel\Composer XE 2013\redist\ia32\mkl
* Running executable by user
  + Add following to path environment variable: C:\Program Files (x86)\Intel\Composer XE 2013\redist\ia32\mkl

---------------------------------------------------------------------------------------------------------------------------------------------------------------------

1: https://software.intel.com/en-us/forums/intel-visual-fortran-compiler-for-windows/topic/486668