IMSL C Numerical Library

Getting Started Guide for Windows

A Technical Guide by Rogue Wave Software.

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IMSL C Numerical Library for Windows

by Rogue Wave Software

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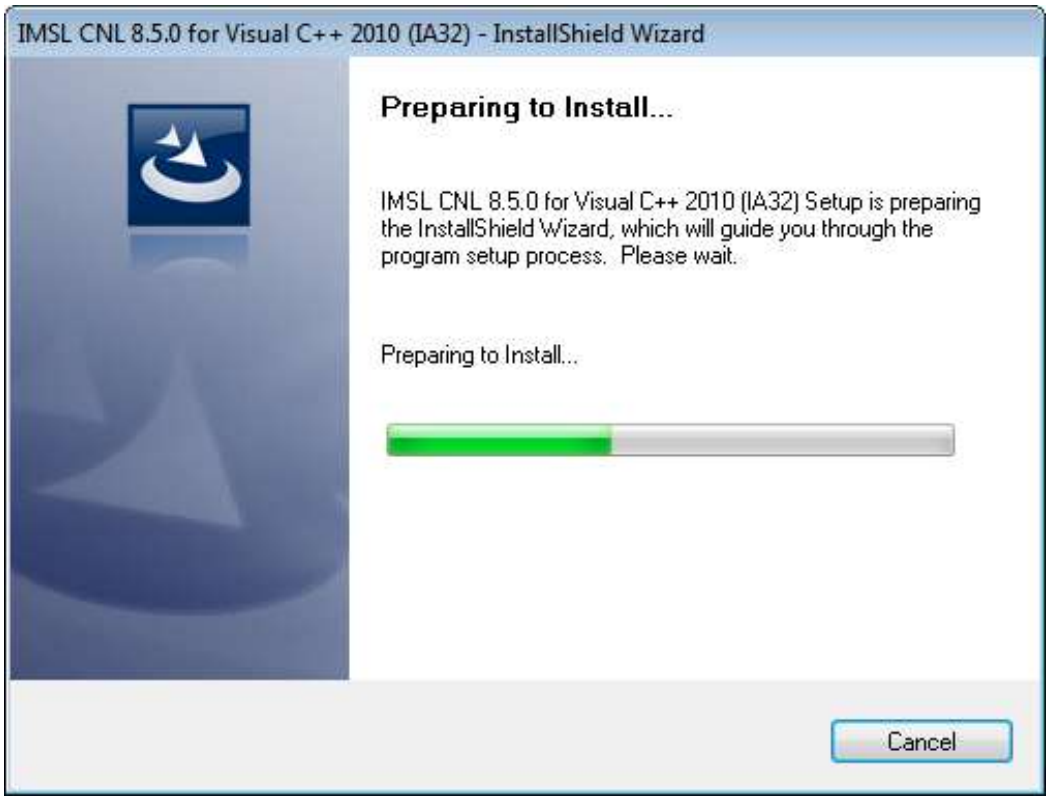
Installing the IMSL C Library v8.5 for Windows

1. Executing the install program

After you have downloaded the product from the FTP site, unzip the file into a temporary folder, then run “setup.exe” from that folder. If you are running Windows 7 or 8, you may have to run the Setup program with administrator privileges, depending on your User Account Control settings. To do this, right-click on setup.exe and choose, “Run as administrator”.

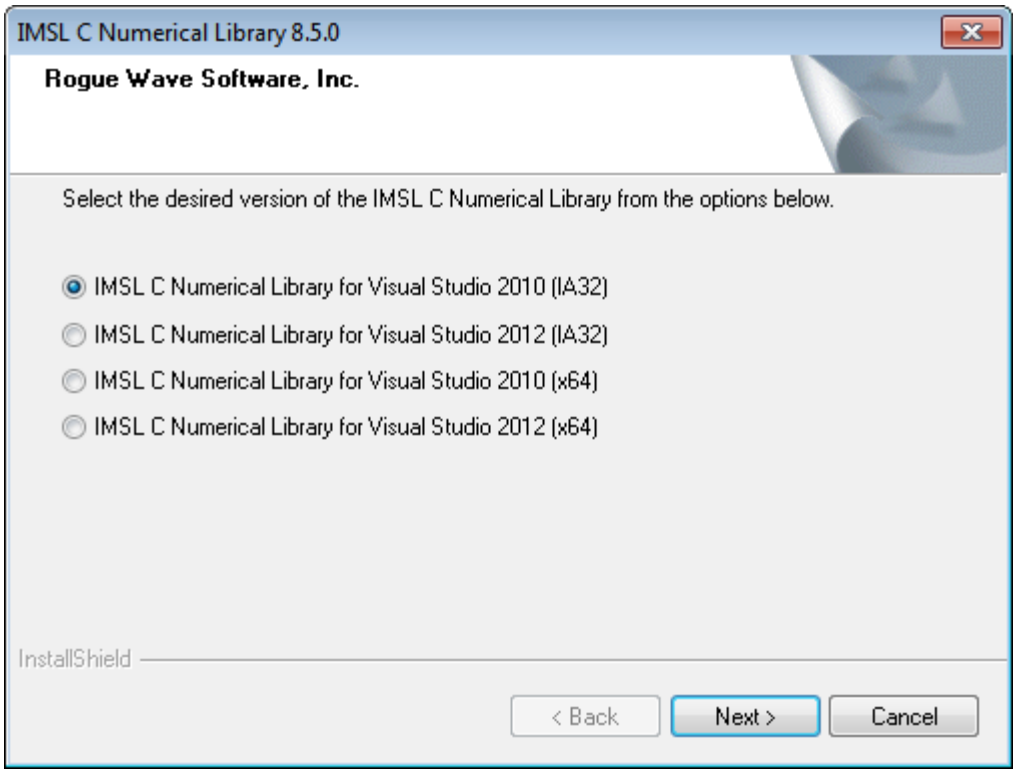
2. Welcome

The first window introduces the installation program for the IMSL C Library.

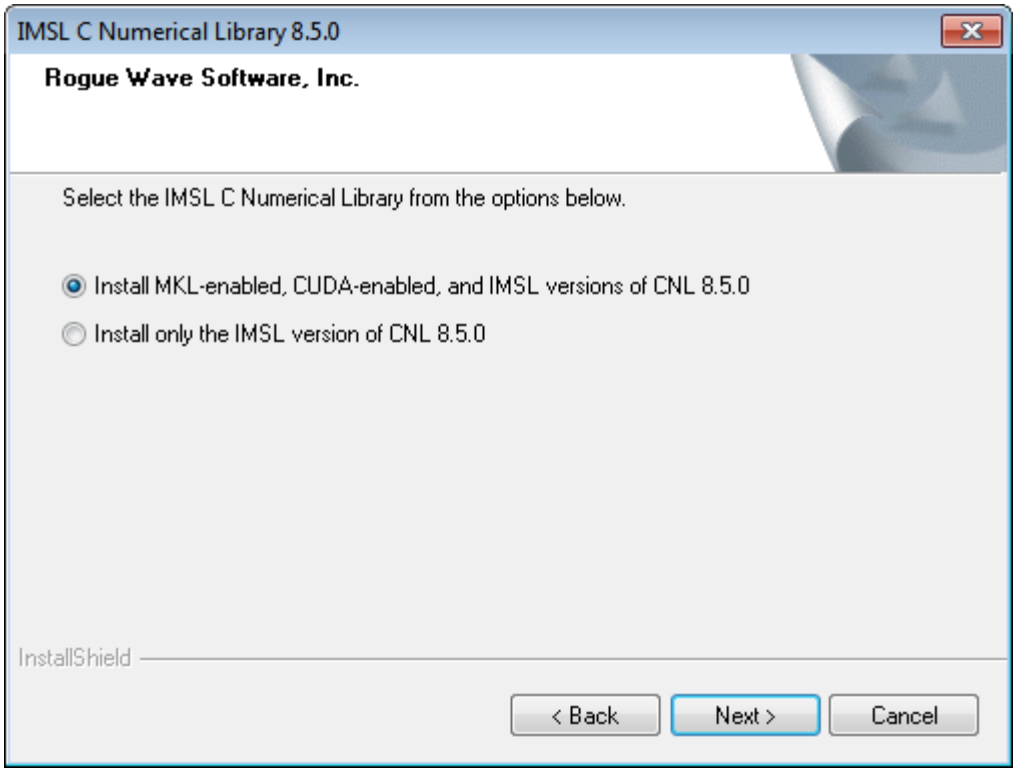


3. Product Selection

This screen allows to you to select from the 32-bit or 64-bit versions of the C Numerical Libraries. Select the appropriate version for your Operating System / Compiler configuration. Press Next> to continue.

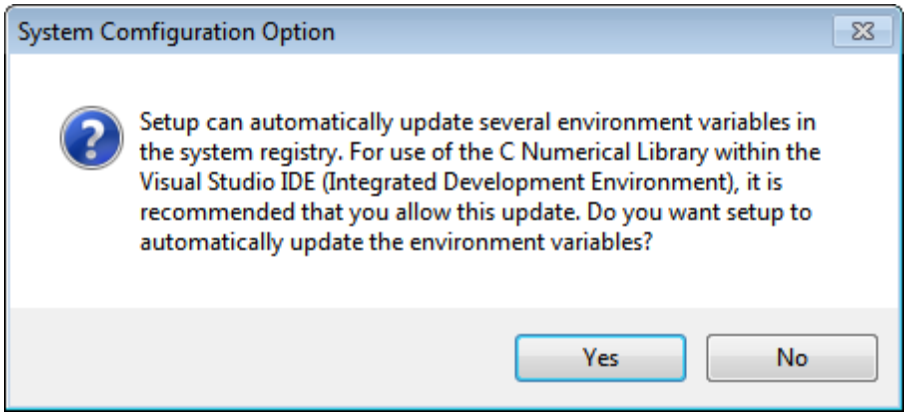


Additionally, two enhanced performance versions of the IMSL C Numerical Library are included with the installation. These are the MKL-enabled and NVIDIA® CUDA-enabled versions of the C Numerical Library. After acknowledging the choice to install them, the user can select to install only the IMSL versions or the two performance versions as well.



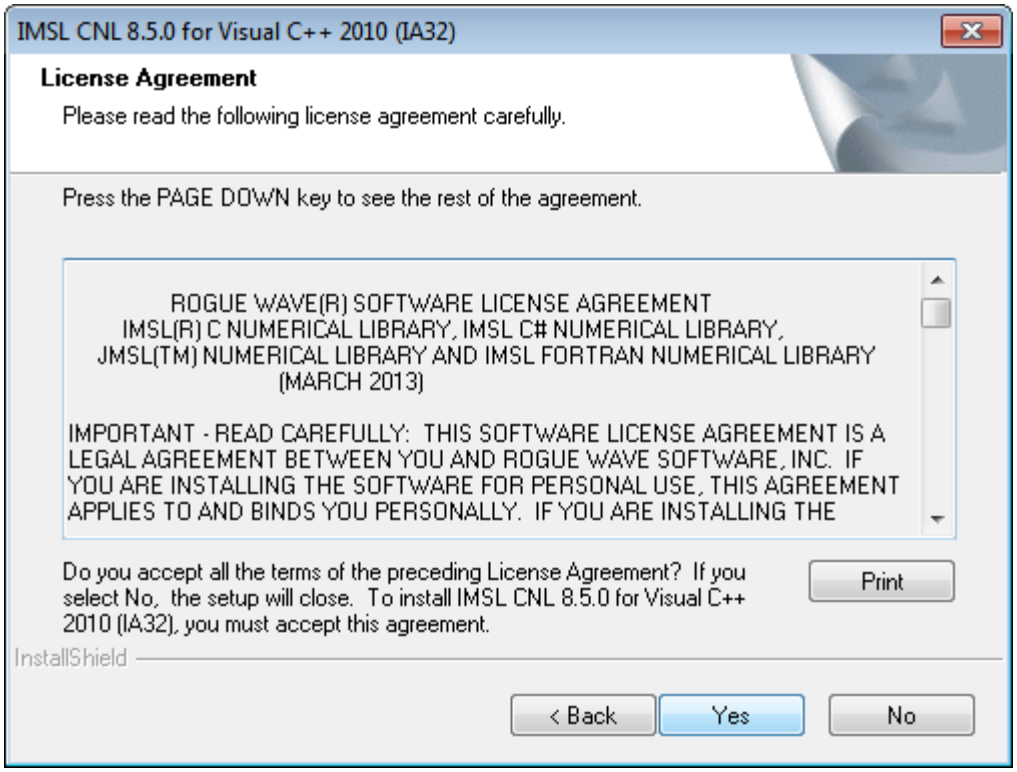
4. Environment variable registration

You will be prompted to automatically update environment variables required to use the IMSL C Library. It is recommended that you perform this update.



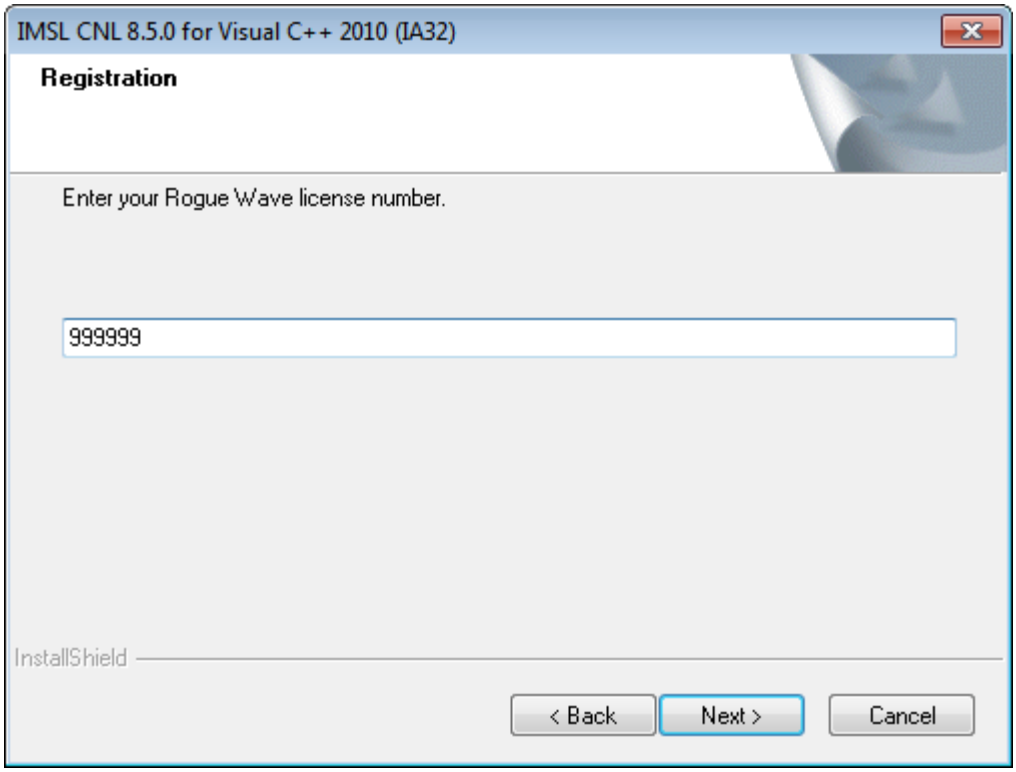
5. License Agreement

This screen presents the end user license agreement. When you have read the contents and agreed, press Yes to continue the installation.



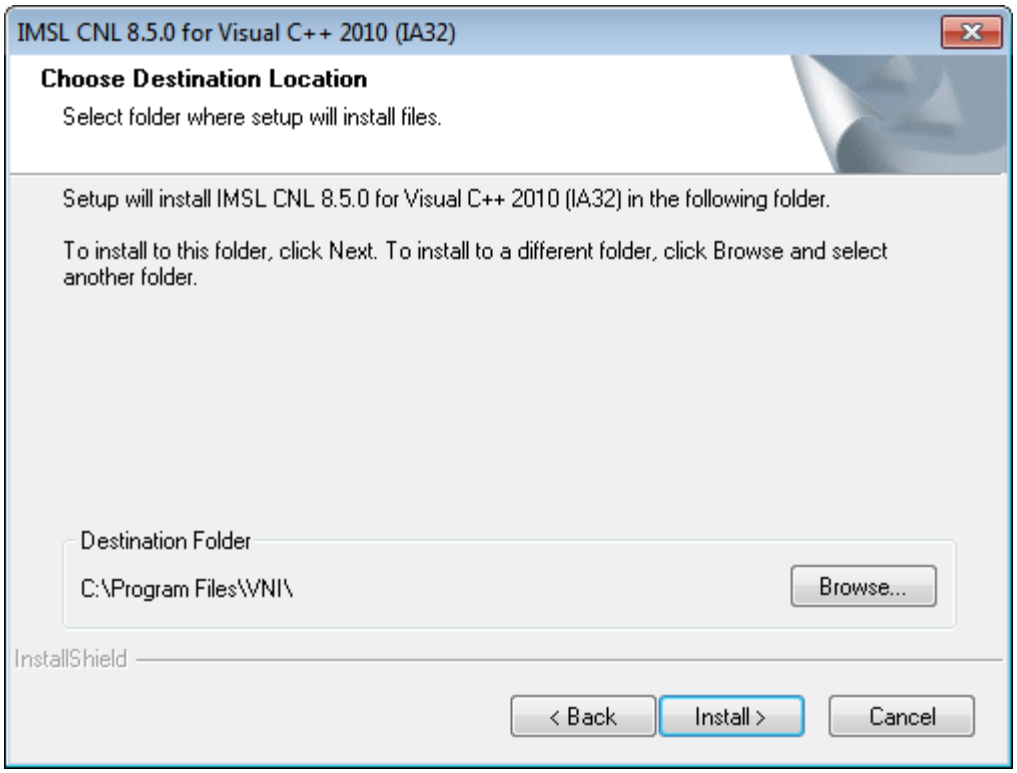
6. License Number

If you have a License Number, enter it at this point. If you do not yet have a license number, or are evaluating the product, input 999999. Press Next> to continue.



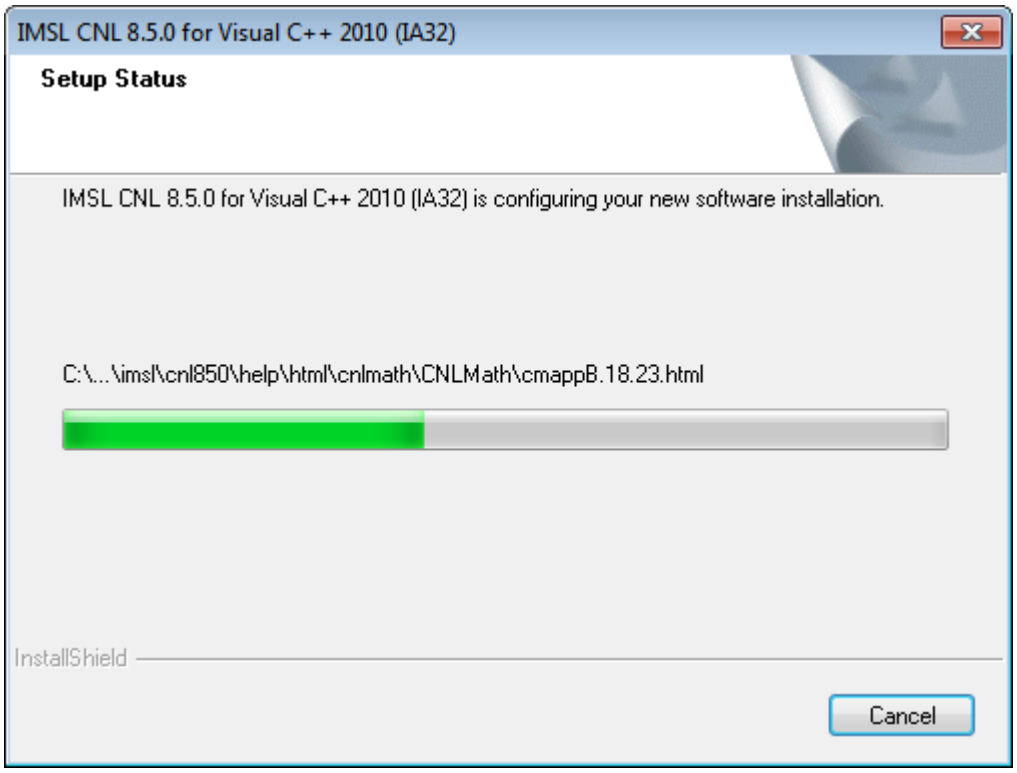
7. Install directory

Set the directory where the IMSL C Library will be installed. The default is C:\Program Files\VNI. Use the Browse button to select an alternate location. You may be prompted to create a directory if it does not exist. Press Next> when you are satisfied with the selection.



8. Installation progress

You will be updated as the installation proceeds.



9. Installation complete

When the setup is complete, you will be prompted to click the Finish button.

10. Restart

Depending on your system, you may be prompted to restart your computer to properly configure the environment variables. Select the appropriate selection to restart now or later.

Using IMSL

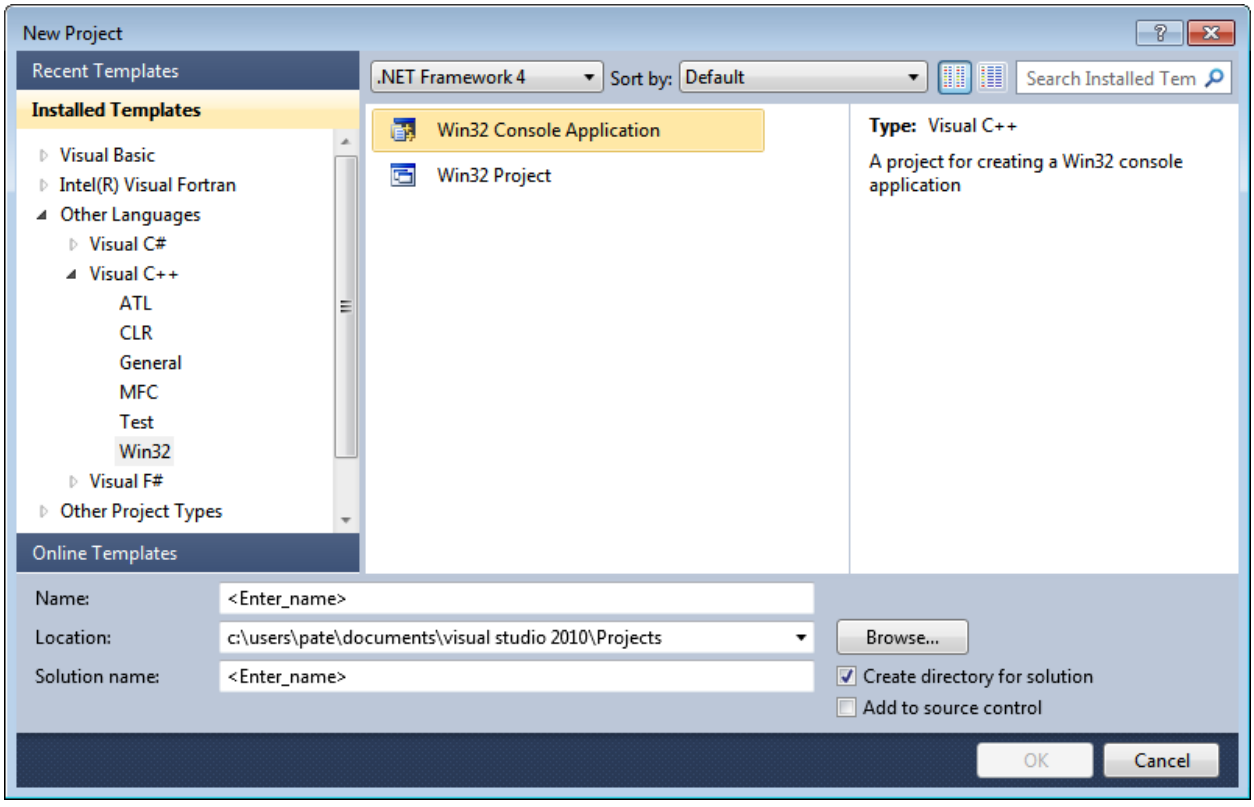
Using the IMSL C Library for Windows

1. Creating a program

This simple example program will solve the following system of linear equations:
33x + 16y + 72z = 129
-24x - 10y - 57z = -96
18x - 11y + 7z = 8.5

2. Start a new project

Start Visual Studio and create a new Visual C++ Win32 Console Project named CNL Test.



3. Add the code

Copy the following text into the cnl.cpp source file and save it.

```
/* Program start */
/* The header file for Mathematics of the IMSL C Library. */
/* For Statistics, use <imsl.h>. */
#include "stdafx.h"
#include <imsl.h>

int _tmain(int argc, _TCHAR* argv[])
{
    /* variable declaration */
    int n = 3;
    float *x;
    static float a[] = {33.0, 16.0, 72.0,
                        -24.0, -10.0, -57.0,
                         18.0, -11.0, 7.0};
    static float b[] = {129.0, -96.0, 8.5};
    float *p_inva;

    /* The main IMSL function call to solve for x in Ax=B.
     * This is the floating point version, to use
     * double-precision arguments, call
     * imsl_d_lin_sol_gen */
    x = imsl_f_lin_sol_gen(n, a, b, 0);

    /* Optional arguments are included after required
     * arguments. These are usually preceded by a constant
     * named IMSL_* indicating which optional argument is
     * being passed.In this example, we request the inverse
     * of the a matrix */
    x = imsl_f_lin_sol_gen (n, a, b, IMSL_INVERSE, &p_inva, 0);

    /* Print the solution x and the inverse of a using
     * write_matrix, a printing utility */
    imsl_f_write_matrix ("Solution x", 1, n, x, 0);
    imsl_f_write_matrix ("Inverse of A", n, n, p_inva, 0);
    return 0;
}
/* Program end */
```

Compiling and running the program

Compiling and executing a program calling the IMSL C Library for Windows

1. Setting the environment variables

The various environment variables may be set automatically at installation time. If you choose not to setup the environment automatically, you must run the cnlenv.bat batch file from the \bin folder in the IMSL C Library install location.

2a. Compile the program from the command line

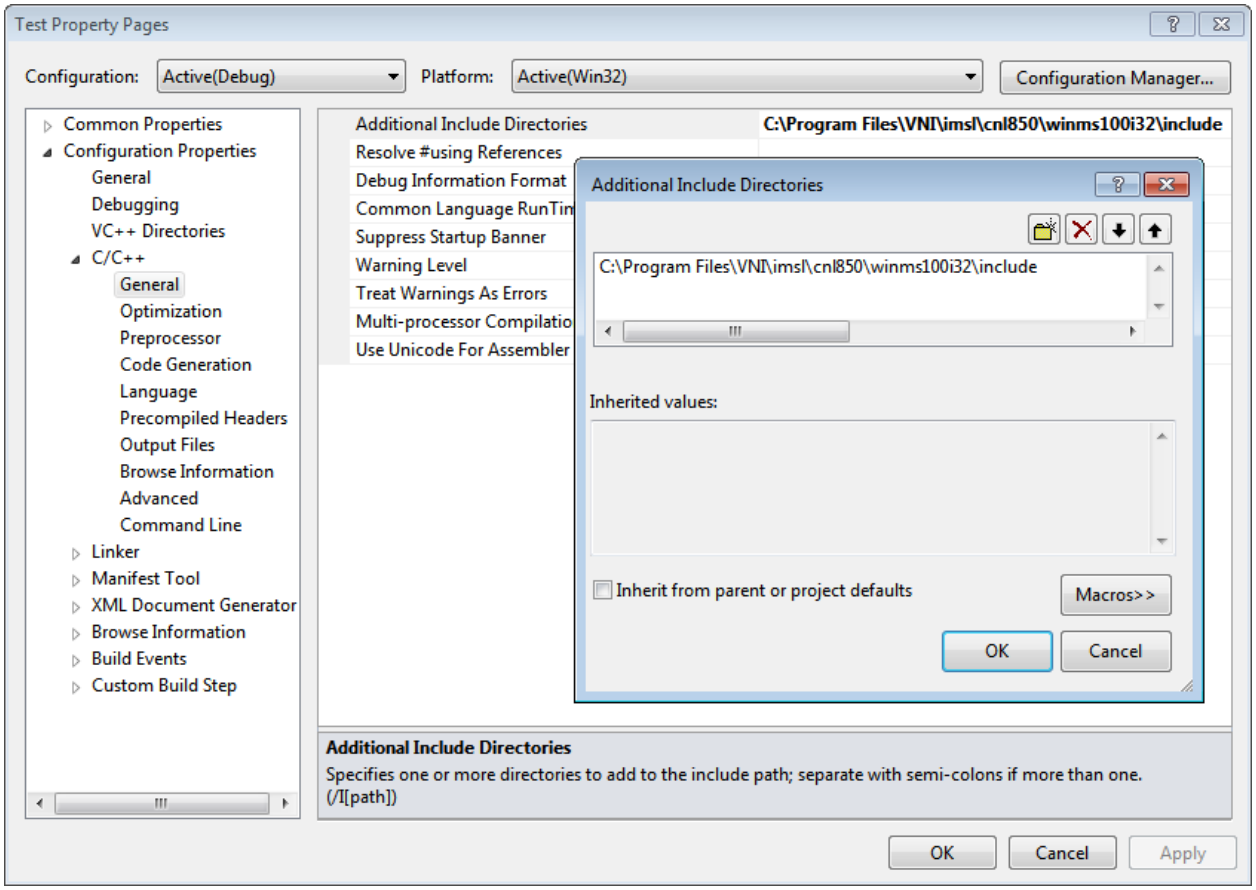
To use the cl command line compiler, start the Visual Studio 2010 .NET Command Prompt from the Start Menu: Start -> All Programs -> Microsoft Visual Studio 2010 -> Visual Studio Tools -> Visual Studio 2010 Command Prompt.

Dynamic Library
> cl cnl.cpp %LINK_CNL_SHARED%

Static Library
> cl cnl.cpp %LINK_CNL_STATIC%

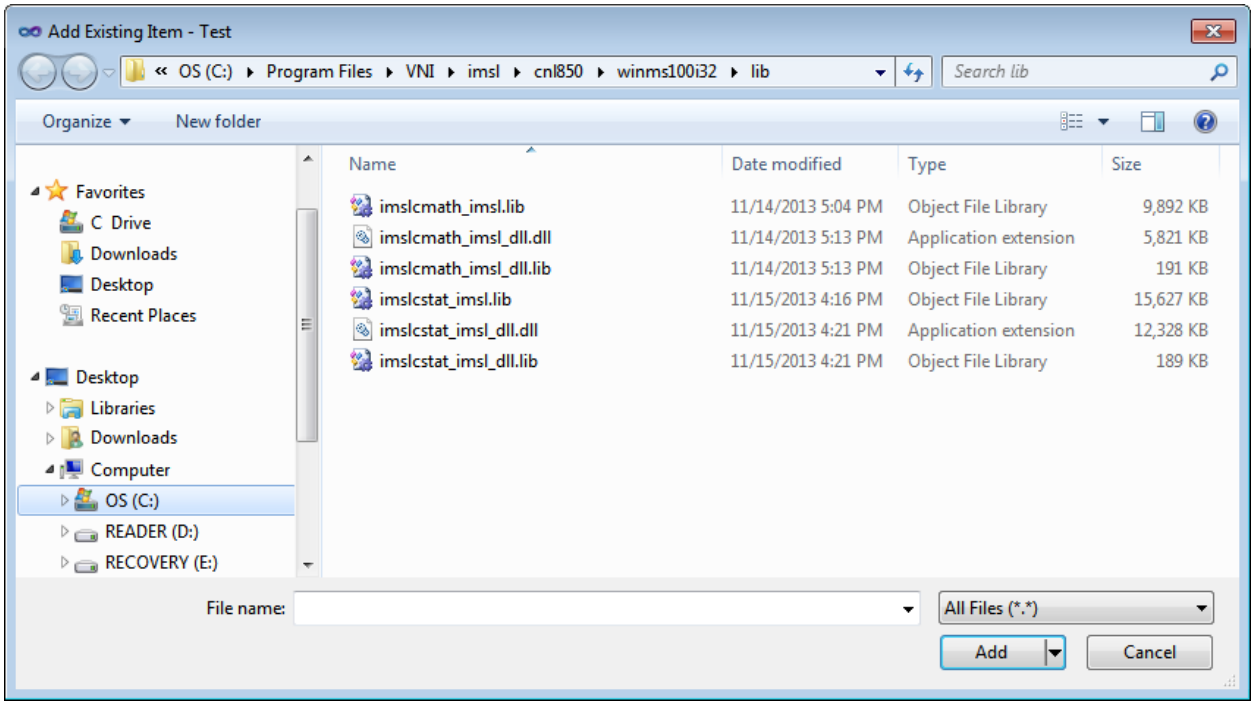
2b. Compile the program using Visual Studio

With the source code entered and saved from the previous document, the properties of the project must be configured to find the IMSL C Library. First, under Project -> CNL Test Properties, open C/C++ -> General. Add the path C:\Program Files\VNI\cnl850\<env>\include to the “Additional Include Directories”. You can use the ellipsis to browse to that folder.



Next, add the Export library for the DLL to the project by choosing Project -> Add Existing Item and browse to:

C:\Program Files\VNI\imsl\cnl850\<env>\imslcmath_imsl.lib.



Finally, compile the project by selecting Build -> Build Solution from the menu bar.

3a. Execute the program from the command line

```
> cnl.exe

              Solution x
          1             2             3
        1.0           1.5           1.0

               Inverse of A
              1             2             3
1        0.1464        0.1899        0.0403
2        0.1802        0.2237       -0.0321
3       -0.0933       -0.1367       -0.0113
```

3b. Execute the program from Visual Studio 2010

From the main menu, select Debug -> Start.

```
              Solution x
          1             2             3
        1.0           1.5           1.0

               Inverse of A
              1             2             3
1        0.1464        0.1899        0.0403
2        0.1802        0.2237       -0.0321
3       -0.0933       -0.1367       -0.0113
Press any key to continue.
```

For more information, refer to the C:\Program Files\VNI\cnl850\<env>\notes\README text files for reference.