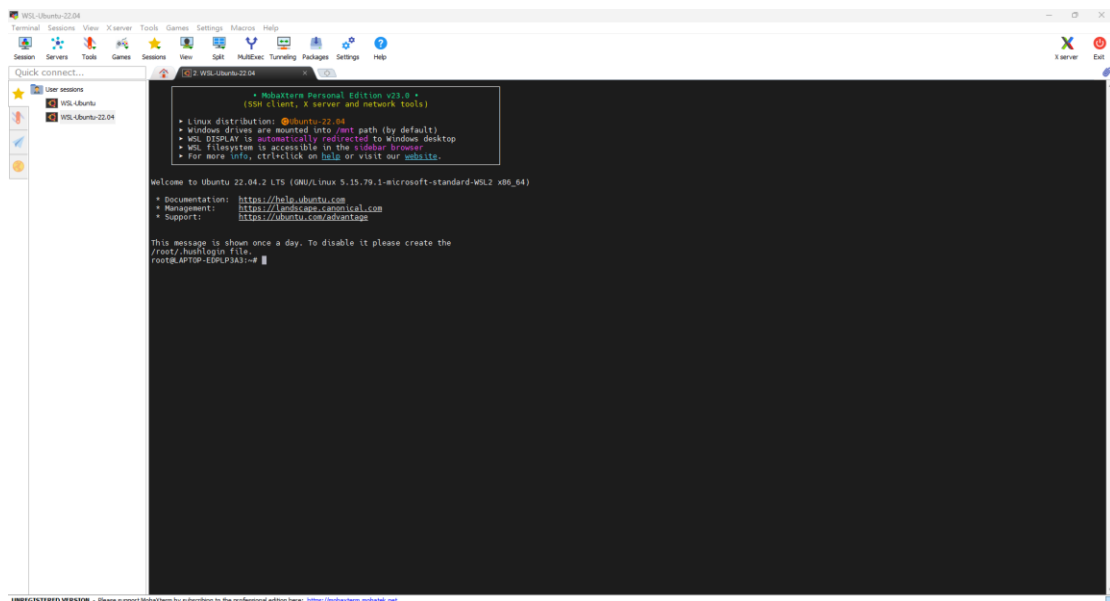


什麼是 MobaXterm

MobaXterm 是一套相當方便好用的視覺化 SSH Client 客戶端軟體，讓習慣在 Windows 下使用滑鼠進行拖拉的新血來說，MobaXterm 有相當多實用的功能能夠讓使用者在使用 SSH 時能夠有更便捷的操作方式，除了直接有視覺化的資料夾顯示與檔案拖拉 sftp 同步連線功能外，還能夠輕易的複製貼上與透過編輯器編輯檔案後自動儲存上傳等功能，算是替操作純終端機的 Linux 系統提升了不少便利與方便，是相當推薦每個新踏入 Linux SSH 的朋友們值得一用的 Client ! (取自網路)

由於兩周前，老師介紹了 MobaXterm，並且為了方便，這次 project 也已此為開發環境，在開啟 wsl-linux 的時候會較為方便。



什麼是 ngspice

ngspice 是一個 mixed-level/mixed-signal 的電路仿真器，他的代碼基於三個開源軟件庫 Spice3f5, Cider1b1 and Xspice.ngspice 修復了很多 bug 和做了很多改進，使得 ngspice 成為一個穩定可靠的仿真器(simulator),因此，除了單獨作為一個仿真器外，ngspice 也被用到了其他項目中，ngspice 是沒有圖形界面的，全部命令行輸入，但是結果輸出會有圖形。(取自網路)

對我來說，是一個可以藉由參數可以匯出圖形的工具。

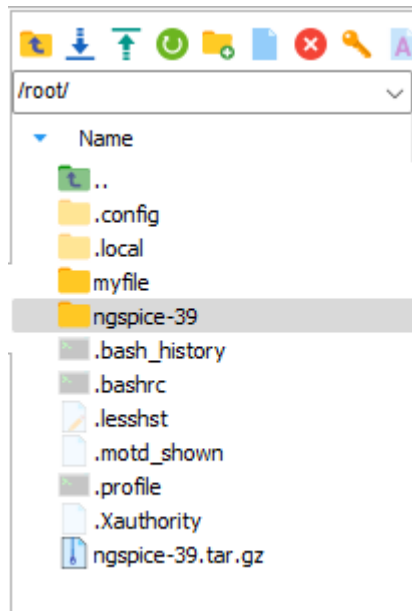
下載方法

1. 到 [Download ngspice-39.tar.gz \(ngspice\) \(sourceforge.net\)](https://sourceforge.net/projects/ngspice/files/ngspice-39.tar.gz/download) 下載 ngspice-39.tar.gz
2. 開啟 WSL-LinuxUbuntu-22.04，並上傳檔案
3. 利用 `tar -zxvf /root/ngspice-39.tar.gz` 此指令解壓縮檔案

```

root@LAPTOP-EDPLP3A3:~# tar -zxvf /root/ngspice-39.tar.gz
ngspice-39/
ngspice-39/m4/
ngspice-39/m4/ax_compare_version.m4
ngspice-39/m4/ax_prog_bison_version.m4
ngspice-39/m4/ax_prog_cc_for_build.m4
ngspice-39/m4/libtool.m4
ngspice-39/m4/ltoptions.m4
ngspice-39/m4/ltsugar.m4
ngspice-39/m4/ltversion.m4
ngspice-39/m4/lt~obsolete.m4
ngspice-39/src/
ngspice-39/src/xspice/
ngspice-39/src/xspice/icm/
ngspice-39/src/xspice/icm/GNUmakefile.in
ngspice-39/src/xspice/icm/makedefs.in
ngspice-39/src/xspice/icm/README
ngspice-39/src/xspice/icm/analog/
ngspice-39/src/xspice/icm/analog/.gitignore
ngspice-39/src/xspice/icm/analog/climit/
ngspice-39/src/xspice/icm/analog/climit/cfunc.mod
ngspice-39/src/xspice/icm/analog/climit/ifspec.ifs
ngspice-39/src/xspice/icm/analog/d_dt/
ngspice-39/src/xspice/icm/analog/d_dt/cfunc.mod
ngspice-39/src/xspice/icm/analog/d_dt/ifspec.ifs
ngspice-39/src/xspice/icm/analog/delay/
ngspice-39/src/xspice/icm/analog/delay/cfunc.mod
ngspice-39/src/xspice/icm/analog/delay/ifspec.ifs
ngspice-39/src/xspice/icm/analog/divide/
ngspice-39/src/xspice/icm/analog/divide/cfunc.mod
ngspice-39/src/xspice/icm/analog/divide/ifspec.ifs
ngspice-39/src/xspice/icm/analog/file_source/
ngspice-39/src/xspice/icm/analog/file_source/cfunc.mod
ngspice-39/src/xspice/icm/analog/file_source/ifspec.ifs
ngspice-39/src/xspice/icm/analog/gain/
ngspice-39/src/xspice/icm/analog/gain/cfunc.mod
ngspice-39/src/xspice/icm/analog/gain/ifspec.ifs
ngspice-39/src/xspice/icm/analog/hyst/
ngspice-39/src/xspice/icm/analog/hyst/cfunc.mod
ngspice-39/src/xspice/icm/analog/hyst/cm_hyst.h
ngspice-39/src/xspice/icm/analog/hyst/ifspec.ifs
ngspice-39/src/xspice/icm/analog/ilimit/
ngspice-39/src/xspice/icm/analog/ilimit/cfunc.mod
ngspice-39/src/xspice/icm/analog/ilimit/ifspec.ifs
ngspice-39/src/xspice/icm/analog/int/
ngspice-39/src/xspice/icm/analog/int/cfunc.mod
ngspice-39/src/xspice/icm/analog/int/ifspec.ifs
ngspice-39/src/xspice/icm/analog/int/int.h
ngspice-39/src/xspice/icm/analog/limit/
ngspice-39/src/xspice/icm/analog/limit/cfunc.mod
ngspice-39/src/xspice/icm/analog/limit/ifspec.ifs
ngspice-39/src/xspice/icm/analog/modpath.lst
ngspice-39/src/xspice/icm/analog/mult/
ngspice-39/src/xspice/icm/analog/mult/cfunc.mod
ngspice-39/src/xspice/icm/analog/mult/ifspec.ifs

```



4. 更新 apt : sudo apt-get update
5. 下載軟體 1 : sudo apt install build-essential
6. 下載軟體 2 : sudo apt install autoconf automake libtool flex libx11-dev libx11-6 libx11-data libbison-dev libxaw7-dev adms libreadline-dev libxml2-dev libxml-libxml-perl

```
root@APTOP-EDLP3A3:~# sudo apt-get update
Hit:1 http://archive.ubuntu.com/ubuntu jammy InRelease
Get:2 http://security.ubuntu.com/ubuntu jammy-security InRelease [110 kB]
Get:3 http://security.ubuntu.com/ubuntu jammy-security/main amd64 Packages [693 kB]
Get:4 http://security.ubuntu.com/ubuntu jammy-security/main Translation-en [142 kB]
Get:5 http://security.ubuntu.com/ubuntu jammy-security/main amd64 c-n-f Metadata [8312 B]
Get:6 http://security.ubuntu.com/ubuntu jammy-security/restricted amd64 Packages [642 kB]
Get:7 http://security.ubuntu.com/ubuntu jammy-security/restricted Translation-en [100 kB]
Get:8 http://security.ubuntu.com/ubuntu jammy-security/universe amd64 Packages [719 kB]
Get:9 http://security.ubuntu.com/ubuntu jammy-security/universe Translation-en [115 kB]
Get:10 http://security.ubuntu.com/ubuntu jammy-security/universe amd64 c-n-f Metadata [13.8 kB]
Get:11 http://security.ubuntu.com/ubuntu jammy-security/multiverse amd64 Packages [19.4 kB]
Get:12 http://security.ubuntu.com/ubuntu jammy-security/multiverse Translation-en [406B B]
Get:13 http://archive.ubuntu.com/ubuntu jammy-updates InRelease [119 kB]
Get:14 http://archive.ubuntu.com/ubuntu jammy-backports InRelease [107 kB]
Get:15 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 Packages [948 kB]
Get:16 http://archive.ubuntu.com/ubuntu jammy-updates/main Translation-en [205 KB]
Get:17 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 c-n-f Metadata [13.7 kB]
Get:18 http://archive.ubuntu.com/ubuntu jammy-updates/restricted amd64 Packages [684 kB]
Get:19 http://archive.ubuntu.com/ubuntu jammy-updates/restricted Translation-en [107 kB]
Get:20 http://archive.ubuntu.com/ubuntu jammy-updates/universe amd64 Packages [899 kB]
Get:21 http://archive.ubuntu.com/ubuntu jammy-updates/universe Translation-en [137 kB]
Get:22 http://archive.ubuntu.com/ubuntu jammy-updates/universe amd64 c-n-f Metadata [13.1 kB]
Get:23 http://archive.ubuntu.com/ubuntu jammy-updates/multiverse amd64 Packages [24.1 kB]
Get:24 http://archive.ubuntu.com/ubuntu jammy-updates/multiverse Translation-en [6312 B]
Fetched 3458 kB in 6s (432 KiB/s)
Reading package lists... Done
root@APTOP-EDLP3A3:~# sudo apt install build-essential
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  bzip2 cpp cpp-11 gkgdk-fontconfig-config fonts-dejavu-core g++ g++-11 gcc gcc-11 gcc-11-base libalgorithm-diff-perl libalgorithm-diff-xs-perl libalgorithm-merge-perl libasan6 libatomic1
  libc-dev-bin libc-devtools libc6-dev libc6-i386 libcrypt-dev libdateformat libgdipg perl libfakeroot libfile-findlock-perl libfontconfig1 libfonttypes libgcc-11-dev libgdb3 libgomp liblzma2 libltn1
  libltn1 libltn1 libjpeg-turbo libjpeg liblsan1 libmpc3 libnsl-dev libquadmath libstdc++-11-dev libtirpc libtirpc-dev libubsan1 libuboxp libupsunix-libc-dev lto-disabled-list make manpages-dev
  rcscsv-prod
Suggested packages:
  bzip2-doc gcc-11-locales debconf-keyring g++-multilib g++-11-multilib gcc-11-doc gcc-mutlib autotools automake libtool flex bison gdb gcc-doc gcc-11-multilib glibc-doc bsr libgd-tools
  libstdc++-11-doc make-doc
The following NEW packages will be installed:
  build-essential bzip2 cpp cpp-11 gkgdk-fontconfig-config fonts-dejavu-core g++ g++-11 gcc gcc-11 gcc-11-base libalgorithm-diff-perl libalgorithm-diff-xs-perl libalgorithm-merge-perl libasan6
  libatomic1 libc-dev-bin libc-devtools libc6-dev libc6-i386 libcrypt-dev libdateformat libgdipg perl libfakeroot libfile-findlock-perl libfontconfig1 libfonttypes libgcc-11-dev libgdb3 libgomp liblzma2
  libltn1 libjpeg libjpeg-turbo libjpeg liblsan1 libmpc3 libnsl-dev libquadmath libstdc++-11-dev libtirpc libtirpc-dev libubsan1 libuboxp libupsunix-libc-dev lto-disabled-list make manpages-dev
  rcscsv-prod
0 upgraded, 53 newly installed, 0 to remove and 11 not upgraded.
Need to get 64.0 MB of archives.
After this operation, 208 MB of additional disk space will be used.
Do you want to continue? [Y/n] Y
Get:1 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 libc-dev-bin amd64 2.35-0ubuntu1 [20.4 kB]
Get:2 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 linux-libc-dev amd64 5.15.0-67.74 [1329 kB]
Get:3 http://archive.ubuntu.com/ubuntu jammy/main amd64 libcrypt-dev amd64 1:4.2.2-1 [112 kB]
Get:4 http://archive.ubuntu.com/ubuntu jammy/main amd64 rcscsv-proto amd64 1.4.2-0ubuntu1 [68.5 kB]
Get:5 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 libtirpc-dev amd64 1.3.2-2ubuntu1 [192 kB]
Get:6 http://archive.ubuntu.com/ubuntu jammy/main amd64 libnsl-dev amd64 1.3.0-2build2 [71.3 kB]
```

7. 創建釋放檔案的資料夾：`mkdir release`
8. 前往資料夾：`cd release`
9. 找到要下載的套件：`../ngspice-39/configure --with-x --with-readline=yes --disable-debug`

```

root@LAPTOP-EDPLP3A3:~# mkdir release
root@LAPTOP-EDPLP3A3:~# cd release
root@LAPTOP-EDPLP3A3:~/release# ../configure --with-x --with-readline=yes --disable-debug
-bash: ../configure: No such file or directory
root@LAPTOP-EDPLP3A3:~/release# ../ngspice-39/configure --with-x --with-readline=yes --disable-debug
checking for a BSD-compatible install... /usr/bin/install -c
checking whether build environment is sane... yes
checking for a thread-safe mkdir -p... /usr/bin/mkdir -p
checking for gawk... gawk
checking whether make sets $(MAKE)... yes
checking whether make supports nested variables... yes
checking whether make supports nested variables... (cached) yes
checking for gcc... gcc
checking whether the C compiler works... yes
checking for C compiler default output file name... a.out
checking for suffix of executables...
checking whether we are cross compiling... no
checking for suffix of object files... o
checking whether we are using the GNU C compiler... yes
checking whether gcc accepts -g... yes
checking for gcc option to accept ISO C89... none needed
checking whether gcc understands -c and -o together... yes
checking for style of include used by make... GNU
checking dependency style of gcc... gcc3
checking for g++... g++
checking whether we are using the GNU C++ compiler... yes
checking whether g++ accepts -g... yes
checking dependency style of g++... gcc3
checking how to run the C preprocessor... gcc -E
checking build system type... x86_64-pc-linux-gnu
checking host system type... x86_64-pc-linux-gnu
checking for gcc... gcc
checking whether we are using the GNU C compiler... (cached) yes
checking whether gcc accepts -g... yes
checking for gcc option to accept ISO C89... (cached) none needed
checking whether gcc understands -c and -o together... (cached) yes
checking dependency style of gcc... (cached) gcc3
checking how to run the C preprocessor... gcc -E
checking for ar... ar
checking the archiver (ar) interface... ar
checking how to print strings... printf
checking for a sed that does not truncate output... /usr/bin/sed
checking for grep that handles long lines and -e... /usr/bin/grep
checking for egrep... /usr/bin/grep -E
checking for fgrep... /usr/bin/grep -F
checking for ld used by gcc... /usr/bin/ld
checking if the linker (/usr/bin/ld) is GNU ld... yes
checking for BSD- or MS-compatible name lister (nm)... /usr/bin/nm -B

```

10. 輸入 make：簡潔明快地理順各個源文件之間紛繁複雜的相互關係

```

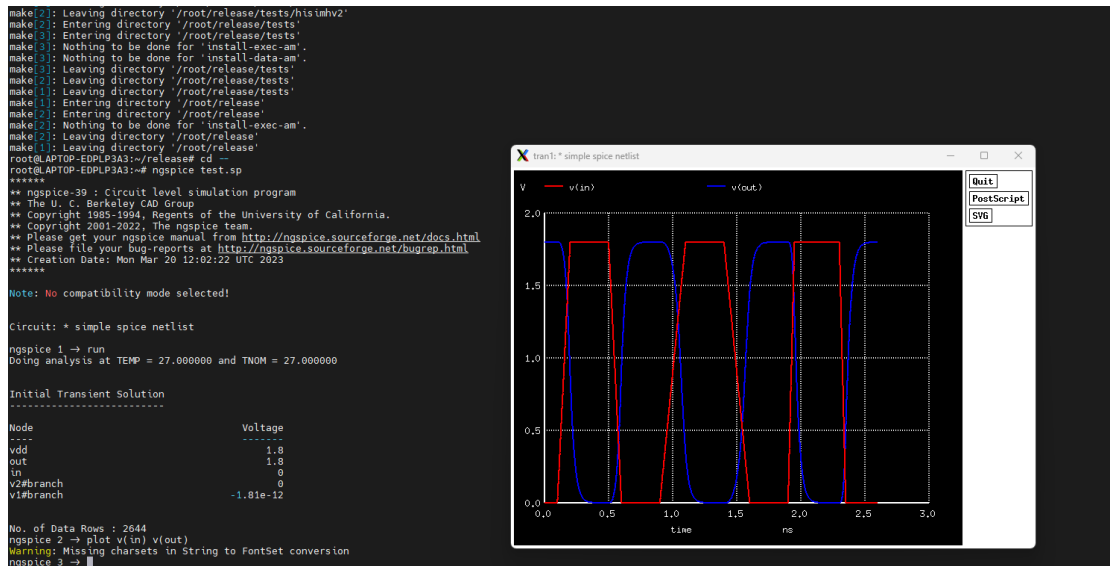
config.status: executing depfiles commands
config.status: executing libtool commands
root@LAPTOP-EDPLP3A3:~/release# make
Making all in src
make[1]: Entering directory '/root/release/src'
Making all in include/ngspice
make[2]: Entering directory '/root/release/src/include/ngspice'
make[2]: Entering directory '/root/release/src/include/ngspice'
make[2]: Nothing to be done for 'all-am'.
make[2]: Leaving directory '/root/release/src/include/ngspice'
make[2]: Leaving directory '/root/release/src/include/ngspice'
Making all in include/cppduals/duals
make[2]: Entering directory '/root/release/src/include/cppduals/duals'
make[2]: Nothing to be done for 'all'.
make[2]: Leaving directory '/root/release/src/include/cppduals/duals'
Making all in misc
make[2]: Entering directory '/root/release/src/misc'
CC      getopt_long_bsd.lo
CC      alloc.lo
CC      dup2.lo
CC      dstring.lo
CC      hash.lo
CC      ivars.lo
CC      mktemp.lo
CC      printhum.lo
CC      string.lo
.././../ngspice-39/src/misc/string.c: In function 'itoa10':
.././../ngspice-39/src/misc/string.c:1495:18: warning: conversion from 'int' to 'char' may change value [-Wconversion]
1495 |         s[i++] = n % 10 + '0';    /* get next digit */
      |                  ^
      |                  ~
.././../ngspice-39/src/misc/string.c: In function 'tvprintf':
.././../ngspice-39/src/misc/string.c:137:56: warning: function may return address of local variable [-Wreturn-local-addr]
137 |         return (p == buf) ? dup_string(p, (size_t) nchars) : p;
      |                                ^~~~~~
      |                                ~~~~~
.././../ngspice-39/src/misc/string.c:91:10: note: declared here
91 |         char buf[1024];
      |         ^~~

```

11. 下載檔案：sudo make install

繪圖

1. 將 test.sp 檔案上傳到 linux
2. 輸入跑檔案的位置；ngspice test.sp
3. 進行：run
4. 繪圖：plot v(in) v(out)
5. 離開：quit



心得

對於這套軟體我還不是很熟悉，藉由老師的影片、moodle 討論區的朋友、軟體資料夾裡的文件終於下載好了，並且藉由網路上的資料，對於語法、套件有些粗淺的認知，我相信未來我對這些套件能越來越了解。

參考資料

[\(26\) Project03 簡介 - YouTube](#)

ngspice-39 裡的 install 介紹

moodle 上同學提出的解決方式

[\[推薦\] MobaXterm - 強大方便好操作的 SSH Client 客戶端連線軟體 - RicharLin.tw](#)

[SPICE 电路仿真（1）--ngspice ngspice 语法 落叶 小唱的博客-CSDN 博客](#)

[Linux/Unix 環境下的 make 和 makefile 詳解 @ 程式專欄 :: 隨意窩 Xuite 日誌](#)