

## GENESIS 2.1.4

### Webpage

<https://www.r-ccs.riken.jp/labs/cbrt/>

### Version

2.1.4

### Build Environment

- gcc 13.1.1 (gcc-toolset/13)
- MKL 2025.0.0.1 (oneAPI 2025.0.1)
- Intel MPI 2021.14.1 (oneAPI 2025.0.1)

### Files Required

- genesis-2.1.4.tar.bz2
- tests-2.1.4.tar.bz2

### Build Procedure

```
#!/bin/sh

VERSION=2.1.4
BASEDIR=/home/users/${USER}/Software/GENESIS/${VERSION}
SRC_TARBALL=${BASEDIR}/genesis-${VERSION}.tar.bz2
TESTS_TARBALL=${BASEDIR}/tests-${VERSION}.tar.bz2

INSTALLDIR=/apl/genesis/2.1.4

WORKDIR=/gwork/users/${USER}
BUILDDIR=${WORKDIR}/genesis-${VERSION}
TESTSDIR=${WORKDIR}/tests-${VERSION}

PARALLEL_TESTS=8

# -----
umask 0022

module -s purge
module -s load gcc-toolset/13
module -s load mkl/2025.0.0.1
module -s load intelmpi/2021.14.1

export LANG=C
export LC_ALL=C
export OMP_NUM_THREADS=1
ulimit -s unlimited

cd ${WORKDIR}
if [ -d genesis-${VERSION} ]; then
  mv genesis-${VERSION} genesis-erase
  rm -rf genesis-erase &
fi

if [ -d tests-${VERSION} ]; then
  mv tests-${VERSION} tests-erase
  rm -rf tests-erase &
fi

tar jxf ${SRC_TARBALL}
tar jxf ${TESTS_TARBALL}
```

```

cd ${BUILDDIR}
FC=mpif90 CC=mpicc \
LAPACK_LIBS="-L${MKLRROOT}/lib/intel64 -WI,--no-as-needed -lmkl_gf_lp64 -lmkl_gnu_thread -lmkl_core -lgomp -lpthread -lm -ldl" \
./configure --prefix=${INSTALLDIR}

make && make install

ATDYN=${INSTALLDIR}/bin/atdyn
SPDYN=${INSTALLDIR}/bin/spdyn

cd ${TESTSDIR}/regression_test

for f in test.py test_remd.py test_fep.py test_rpath.py \
    test_vib.py test_gamd.py \
    test_analysis/test_analysis.py \
    test_spana/test_spana.py; do
    sed -i -e "s/env python/env python3/" $f
done

# atdyn tests
./test.py      "mpirun -np ${PARALLEL_TESTS} $ATDYN"
./test_remd.py "mpirun -np ${PARALLEL_TESTS} $ATDYN"
./test_rpath.py "mpirun -np ${PARALLEL_TESTS} $ATDYN"
./test_vib.py  "mpirun -np ${PARALLEL_TESTS} $ATDYN"
./test_gamd.py "mpirun -np ${PARALLEL_TESTS} $ATDYN"
#./test_fep.py "mpirun -np ${PARALLEL_TESTS} $ATDYN" # spdyn only

# spdyn tests
./test.py      "mpirun -np ${PARALLEL_TESTS} $SPDYN"
./test_remd.py "mpirun -np ${PARALLEL_TESTS} $SPDYN"
./test_rpath.py "mpirun -np ${PARALLEL_TESTS} $SPDYN"
./test_gamd.py "mpirun -np ${PARALLEL_TESTS} $SPDYN"
./test_fep.py  "mpirun -np ${PARALLEL_TESTS} $SPDYN"

cd test_analysis
./test_analysis.py ${INSTALLDIR}/bin
cd ../

cd test_spana
# ad hoc
sed -i -e 'ref_fobj =/s/"r"/"r", encoding="utf-8"/' test_spana.py
sed -i -e 'out_fobj =/s/"r"/"r", encoding="utf-8"/' test_spana.py
./test_spana.py ${INSTALLDIR}/bin
cd ..

```

## Notes

- In the uun benchmark, 2.1.4 (gcc13) shows better performance than 2.1.2 (gcc12).
- GCC version shows better performance than Intel Compiler as of the previous versions.
  - For intel compiler, `-march=core-avx2` is slightly better than `-xCORE-AVX2`