

**ecx**

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0.1.0dev0+d0fff93

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# 1 Getting Ready

## 1.1 Examples

### 1.1.1 Fortran

Here is an example of how to use libecx in Fortran.

```
program example_in_f
    use iso_fortran_env
    use ecx
    implicit none

    real(real64) :: w(3) = [1.0d0, 1.0d0, 100.0d0]
    real(real64) :: r = 100.0d0
    real(real64) :: p(3) = 0.0d0
    character(len=1) :: e
    integer :: errstat
    complex(real64) :: zout(3)
    character(len=:), pointer :: errmsg

    p(1) = r
    e = "R"
    call z(p, w, zout, e, errstat, errmsg)
    print *, zout
    print *, errstat, errmsg

end program
```

### 1.1.2 C

Here is an example of how to use libecx in C.

```
#include <stdio.h>
#include <stdlib.h>
#include "ecx.h"

int main(void){

    int errstat, i;
    double w[3] = {1.0, 1.0, 1.0};
    double p[3] = {100.00, 0.0, 0.0};
    ecx_cdouble z[3] = {ecx_cbuild(0.0,0.0),
                        ecx_cbuild(0.0, 0.0),
                        ecx_cbuild(0.0, 0.0)};
    char *errmsg;
```

```
    ecx_eis_z(p, w, z, 'R', 3, 3, &errstat, &errmsg);

    for(i=0; i<3;i++){
        printf("%f %f \n", creal(z[i]), cimag(z[i]));
    }
    printf("%d %s\n", errstat, errmsg);
    return EXIT_SUCCESS;
}
```

### 1.1.3 Python

Here is an example of how to use libecx in Python.

```
import sys
sys.path.insert(0, "../py/src/")
import numpy as np
from pyecx import eis
import matplotlib.pyplot as plt

R = 100
C = 1e-6
w = np.logspace(6, -3, 100)

p = np.asarray([R, 0.0, 0.0])
zr = np.asarray(eis.z("R", w, p))
p = np.asarray([C, 0.0, 0.0])
zc = np.asarray(eis.z("C", w, p))
zrc = zr*zc / (zr+zc)
print("finish")

fig = plt.figure()
ax = fig.add_subplot(111)

ax.set_aspect("equal")
ax.plot(zrc.real, zrc.imag, "g.", label="R/C")

ax.invert_yaxis()

plt.show()
```

## 2 Man Pages

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ecx(3f) Library Functions Manual ecx(3f)

### NAME

ecx - Main module for the ECX library.

### SYNOPSIS

Available modules:  
o ecx\_\_api  
o ecx\_\_capi

### DESCRIPTION

The ECX library allows to compute:

- o kinetics  
    Nernst, Tafel
- o impedance  
    EIS, DIA

### EXAMPLE

Minimal program:

```
program example
    use ecx
end program
```

### SEE ALSO

complex(7)

ecx

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ecx(3f)

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