

Appendix B

Kramers-Kronig Program Code

This is the IGOR Pro code used to perform Kramers-Kronig transformations. Double slashes `//` indicate remarks

```
Proc kkimaginarytorealAG(imagpartwave)
  string imagpartwave
  pauseupdate;silent 1

  // create a variable for the number of rows in the input wave
  Variable/D dimension=DimSize($imagpartwave,0)

  // Create a complex wave with the input data in the real part,
  and zero's in the imaginary part

  Make/d/c/o/n=(dimension) input_cmplx=cmplx(0,$imagpartwave)

  // Fast Fourier Transform the complex input wave

  iFFT/c Input_cmplx

  input_cmplx[0]=0.5*input_cmplx[0]
  setscale/i x -0.5, 0.5, input_cmplx

  //Now enforce causality by removing all '
  values for times less than zero

  Variable counter=0

  do
```

```
    if(pnt2x(input_cplx,counter)>0)
        input_cplx[counter]=0
    endif

counter+=1
While(counter<dimension)

// Fast Fourier Transform back to E space

FFT input_cplx

setscale/p x,0,1, input_cplx
input_cplx*=2

// Make output waves for real and imaginary parts

Make/d/o/n=(dimension) ioutput_real, ioutput_imag

copyscales $imagpartwave, ioutput_real, ioutput_imag

Ioutput_real=-real(input_cplx)
Ioutput_imag=imag(input_cplx)

Display $imagpartwave
Appendtograph ioutput_real, ioutput_imag
differentcolorsino()
Updatelegendino(3)
ModifyGraph mode($imagpartwave)=4,msize($imagpartwave)=1
End
```