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PROGRAM e2pd
*****
* Conversion of dielectric functions to psi and delta *
* From standard input provide: *
* input file name *
* angle of incidence in degrees *
* the standard input file must have the format x eps1 eps2 *
* The outputfile comes as: x psi delta *
*****
REAL X(100000),e1,e2,psi,rho,del,teta,sn1,sn2,cs1,cs2,pi
complex eps,epsil(100000),n1,n2,rp,rs,rps
INTEGER I,mm
character*40 flin
read(*,'(a40)') flin
open(23,file=flin)
mm=100000
read(*,*) teta
pi=4.*atan(1.)
teta=teta*pi/180
sn1=sin(teta)
sn2=sn1**2
cs2=1.-sn2
cs1=sqrt(cs2)
do 10 i=1,mm
  READ(23,*,END=11) X(i),e1,e2
  epsil(i)=cplx(e1,e2)
10 continue
11 mm=i-1
close(23)
do 25 i=1,mm
  eps=epsil(i)
  n1=eps*cs1
  n2=csqrt(eps-sn2)
  rp=(n1-n2)/(n1+n2)
  n1=cs1
  rs=(n1-n2)/(n1+n2)
  rps=rp/rs
  rho=real(cabs(rps))
  psi=atan(rho)
  del=aimag(clog(rps))
  write(*,*) x(i),psi,del
25 continue
END

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