

Erratum

He, X.; Ku, D.N.; Moore, J.E., Jr. Simple calculation of the velocity profiles for pulsatile flow in a blood vessel using Mathematica. *Ann. Biomed. Eng.* 21:45-49; 1993.

The original publication of this program in the volume indicated above contained several typographical errors. Below are revisions to the computer program for Mathematica v 2.1.

```
modein = Input["modein ="];
modeout = Input["modeout ="];
re = Input["Re ="];
wo = Input["Wo ="];
filename=InputString["Filename? "];
Print[" Program is running.  Waiting..."];
wave1 = ReadList[filename];

nh = 10;
sqi = I^1.5*wo;
l=Length[wave1];
mean=Sum[wave1[[i]],{i,1}]/l
wave1=wave1/mean;
wave1f=InverseFourier[wave1]*Sqrt[(2*nh-1)/l]/N;
b0 = Table[BesselJ[0,sqi*Sqrt[i]],{i,nh-1}];
b1 = Table[BesselJ[1,sqi*Sqrt[i]],{i,nh-1}];

hr[mode_Integer,i_Integer] :=
  If[i==0,
    If[mode==1,fr = 1,
      If[mode==2,fr = 0.125,
        If[mode==3,fr = 0.25,
          If[mode==4,fr = 0.5]]]],
    If[mode==1,fr = -b0[[i]]*sqi^2*i,
      If[mode==2,fr = b0[[i]]-2*b1[[i]]/sqi/Sqrt[i],
        If[mode==3,fr = b0[[i]]-1,
          If[mode==4,fr = -b1[[i]]*sqi*Sqrt[i]]]]];
w1 = Table[wave1f[[i]]*hr[modeout,i-1]/hr[modein,i-1]/N,
  {i,1,nh}];
w2 = Conjugate[Table[w1[[nh-i+1]],{i,nh-1}]];
wot=Re[Fourier[Join[w1,w2]]];

ListPlot[Table[{{(i-1)*360/(1-1)//N, wave1[[i]]}, {i,1}},
  ,Ticks->{{0,90,180,270,360},Automatic}
  ,PlotJoined->True]

ListPlot[Table[{{(i-1)*180/(nh-1)//N,wot[[i]]}, {i,nh*2-1}},
  ,Ticks->{{0,90,180,270,360},Automatic}
  ,PlotJoined->True]
```

```

Print["Minimum value: ",Min[wot]];
Print["Maximum value: ",Max[wot]];

Block[{i,k,nroot,negt},
k=1;
z[k] = 0;
For[i=2,i<=nh*2-1,i++,
  If[wot[[i-1]]*wot[[i]]<0,
    {k=k+1;
     z[k]=(i-1-wot[[i]]/(wot[[i]]-wot[[i-1]]))*180/(nh-1);
     Print[z[k]]
    }]];
z[k+1]=360;
nroot=k+1;

negt=0;
If[wot[[1]]<0,i0=1,i0=2];
For[i=i0,i<nroot,i+=2,negt=negt+z[i+1]-z[i]];
Print["Ratio of time for negative value: ",rot=negt/360]]

s1=Sum[wot[[i]],{i,nh*2-1}]/(nh*2-1);
s2=Sum[Abs[wot[[i]]],{i,nh*2-1}]/(nh*2-1);
roa = 0.5*(s2-s1)/s1

nn=20;
wot=Table[i,{i,0,nn}];
For[j=0,j<nn+1,j++,
w1 = Table[wave1f[[i+1]]*(b0[[i]] -
  BesselJ[0,sqi*Sqrt[i]*j/nn])/hr[modein,i],{i,nh-1}]/N;
w1 = Prepend[w1,(1-(j/nn)^2)*0.25*wave1f[[1]]/hr[modein,0]];
w2 = Conjugate[Table[w1[[nh-i+1]],{i,nh-1}]];
wot[[j]]=Table[Re[Fourier[Join[w1,w2]]]]
];

a=40/Max[wot[[0,1]]];
For[j=1,j<nh*2,j++,
e[j]=ListPlot[Table[{wot[[i,j]]*a+(j-1)*180/(nh-1),i/nn}
  ,{i,0,nn}
  ,PlotRange->{{0,400},{0,1}}
  ,Ticks->{{0,90,180,270,360},
    {0,0.2,0.4,0.6,0.8,1.}}
  ,DisplayFunction->Identity
  ,PlotJoined->True]];

Show[Release[Table[e[k],{k,1,nh*2-1}]],
  DisplayFunction->$DisplayFunction];

```