
Subject: Amoeba function

Posted by [Nicki](#) on Thu, 19 Nov 2009 01:18:51 GMT

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I have the following problem with my amoeba code: It does not do its job ;) (Probably because i didn't write it right). It's supposed to find the minimum. But it only finds a local minimum (I guess) not a global one.

This is the code:

```
FUNCTION CONSTRAINT,Pin
COMMON FUNC_XY, P0, dP
return,P0+2*dP/!pi*atan(Pin)
END
FUNCTION FUNC, Pin, NOCONSTR=NOCONSTR
if keyword_set(NOCONSTR) then P=Pin $
else P=CONSTRAINT(Pin)
nrows=1.      ;number of rows
mu=438.689    ;attenuation coefficient
r_tot=1.5     ;target resolution
r_i=P[3]      ;detector intrinsic resolution
rad=P[0]      ;distance 'centre of source'-pinhole
wdet=P[1]     ;detector width
dfov=P[2]     ;diameter of the field-of-view
a=180/!pi*2*asin(dfov/2/rad) ;pinhole opening angle
f=wdet/2/(tan(a/2/180*!pi)) ;distance pinhole-detector
N=2.*!pi*(rad+f)/(1.1*wdet)*Nrows ;number of pinholes/detectors
d=sqrt(R_tot^2-(rad/f)^2*(R_i)^2)/((rad/f)+1.)-alog(2)/mu*ta n(a/2*!pi/180) ;pinhole diameter
deffs=sqrt(d^2+2/mu*d*tan(a/2*!pi/180)+2/(mu^2)*(tan(a/2/180 *!pi))^2) ;effective diameter (Sensitivity)
S=N*deffs^2/16/(rad^2)*100 ;Sensitivity
if ~finite(s) then stop
RETURN, -S
END

pro numerical
COMMON FUNC_XY, P0, dP
P0=[60., 80., 80., 0.45] ;initial starting point
dP=[27., 20., 20., 0.4] ;scale
R=AMOEB(1.0e-5,SCALE=dP, P0=P0, FUNCTION_VALUE=fval) ;result
if r[0] eq -1 then begin
    print,'No minimum found.'
    return
endif
xmax=CONSTRAINT(r)
ymax=-fval[0]
```

END

It gives me a minimum (or in this case actually maximum, but anyway...) for $R_i=0.05$ and $w_{det}=100$. S_{max} is then 0.0088 or s.th like that. However, if i remove R_i and w_{det} from the constraint and put them into the input, as $R_i=0.05$ and $w_{det}=100$,

```
.....
r_i=0.05      ;detector intrinsic resolution
rad=P[0]      ;distance 'centre of source'-pinhole
wdet=100.     ;detector width
dfov=P[1]     ;diameter of the field-of-view
a=180/pi*2*asin(dfov/2/rad) ;pinhole opening angle
f=wdet/2/(tan(a/2/180*pi)) ;distance pinhole-detector
N=2.*pi*(rad+f)/(1.1*wdet)*Nrows ;number of pinholes/detectors
d=sqrt(R_tot^2-(rad/f)^2*(R_i)^2)/((rad/f)+1.)-alog(2)/mu*tan(a/2*pi/180) ;pinhole diameter
deffs=sqrt(d^2+2/mu*d*tan(a/2*pi/180)+2/(mu^2)*(tan(a/2/180*pi))^2) ;effective diameter (Sensitivity)
S=N*deffs^2/16/(rad^2)*100 ;Sensitivity
if ~finite(s) then stop
RETURN, -S
END
pro numerical
COMMON FUNC_XY, P0, dP
P0=[60., 80.] ;initial starting point
dP=[27., 20.]
.....
```

i get a much higher S_{max} of 0.012, which is pretty weird. Does anybody get what i mean and can maybe help me out???
