Appendixes

Appendix A

```
                                                ;x=0.0003
                                                ;y=0.0002
                                                 ;L=0.394
                                                 ;B=0.475
                                                ;r1=2.317
                                                ;r2=0.335
                                                ;k1=0.602
                                                 ;k2=0.66
                                               ;k3=1/1024
                                      ;(R=sqrt(x^2+y^2
                                          ;(O=atan(y/x
                           ;V=k1*(1-exp(-k2*R^2))+k3*R^2
                                             ;Z=O+V
                                            if R>r2
                  ;(((F=10.^(L(cos(log((R/r1)/B)-1
                                               else
                                             ;F=R
                                               end
                        ;(((P=F./(R*sqrt((1+(tan(Z))^2
                                    ;(Q=P*tan(Z
                                       ;IBO=10
                                  ;SNR1=0:1:30


                                    ;(IBO1=10.^(IBO/10
 x1=sqrt(((0.5.*F^2)./((0.5.*(r1^2).*10.^((-
;((log(IBO1./10))./10))).*2.*10.^(SNR1./10).*P^2
 x2=sqrt(((0.5.*F^2)./((0.5.*(r1^2).*10.^((-
;((log(IBO1./10))./10))).*2.*10.^(SNR1./10).*Q^2

                               ;(Q1=0.5*erfc(x1*0.707
                               ;(Q2=0.5*erfc(x2*0.707
                                     ;(Pe=0.5.*(Q1+Q2
                                   ;('semilogy(IBO,Pe,'m
                                       ;hold on
```

Appendix B

```
                                                    ;x=0.0003
                                                    ;y=0.0002
                                                     ;L=0.394
                                                     ;B=0.475
                                                    ;r1=2.317
                                                    ;r2=0.335
                                                    ;k1=0.602
                                                     ;k2=0.66
                                                   ;k3=1/1024
                                                 ;k4=1/0.0249
                                          ;(R=sqrt(x^2+y^2
                                              ;(O=atan(y/x
                                  ;V=k1*(1-exp(-k2*R^2))+k3*R^2
                                                    ;Z=O+V
                                                  if R>r2
                          ;(((F=10^(L(cos(log((R/r1)/B)-1
                                                     else
                                                   ;F=R
                                                      end
                                  ;(((P=F/(R*sqrt((1+(tan(Z))^2
                                                ;(Q=P*tan(Z
                                                  ;SNR1=10
                                               ;IBO=0:1:40



                                                ;(IBO1=10.^(IBO/10
                                  x1=sqrt(((0.5*F^2)./(0.5*r1^2*10.^((-
                                  ;((log(IBO1/10))/10))*2*10.^(SNR1/10)*P^2
                                  x2=sqrt(((0.5*F^2)./(0.5*r1^2*10.^((-
                                  ;((log(IBO1/10))/10))*2*10.^(SNR1/10)*Q^2
                                                    ;N=1000
                                               ;(w=exp(-x1*0.5
                                                    ;a=0.0000
                                                     ;pi=3.14
                                                         ;b=1
                                                  ;h=(b-a)/N
                                                     ;z1=0
;z2=(1./(0.84*sqrt(x1)+0.159*sqrt(x1+6.28)))*2*k4*exp(-k4)*0.399.*w
                                                   ;sum1=z1+z2

                                                  for i=1:N-1
                          sum2=(1./((1-(1/2*pi)).*sqrt(x1*(a+i*h))+
                    ((1/6.28)*sqrt(x1.*(a+i*h)+6.28))).*(1/sqrt(6.28).*exp((-
                ;((((x1.*(a+i*h))/2)*2*k4.*(a+i*h)*exp(-k4.*(a+i*h).*(a+i*h
                                                      end
                                                 ;sum3=2*sum2
                                                ;sum4=sum1+sum3
```

```
;int1=0.5*h*sum4
-----------------------------------------------------------------------%
------

;z1=0
z2=1./((1-
1/6.28).*sqrt(x2)+(1/6.28).*sqrt(x2+6.28).*(1/sqrt(6.28).*exp(-
;(((x2/2)*2*k4.*exp(-k4
;sum1=z1+z2

for i=1:N-1
sum2=(1./((1-(1/2*pi)).*sqrt(x2.*(a+i*h))
+(1/6.28).*sqrt(x2.*((a+i*h))+6.28)).*(1/sqrt(6.28).*exp((-
;((((x2.*(a+i*h))/2)*2*k4*(a+i*h).*exp(-k4*(a+i*h).*(a+i*h
end
;sum3=2*sum2
;sum4=sum1+sum3
;int2=0.5*h*sum4
;int3=int1+int2
-----------------------------------------------------------------------%
------

;a=0.0001
;b=1
;h=(b-a)/N
z1=((0.0001^-2)./((1-
(1/6.28)).*sqrt(10000*x1)+(1/6.28).*(sqrt(10000*x1+6.28))).*(1/sqrt(6
;(((.28).*exp(-0.5*(x1*10000))*2*10000*k4*exp(-k4*0.0001^-2
z2=((0.0001^-2)./((1-
(1/6.28)).*sqrt(x1)+(1/6.28).*(sqrt(x1+6.28))).*(1/sqrt(6.28).*exp(-
;(((0.5*(x1))*2*k4.*exp(-k4

;sum1=z1+z2

for i=1:N-1
sum2=((a+i*h).^-2)./((1-(1/2*pi)).*(sqrt(x1.*(a+i*h).^-1))
+(1/6.28).*(sqrt(x1*((a+i*h).^-1)+6.28)).*(1/sqrt(6.28).*(exp(-
;(((0.5*x1.*(a+i*h).^-1))*2*k4*((a+i*h).^-1).*exp(-k4*(a+i*h).^-2
end
;sum3=2*sum2
;sum4=sum1+sum3
;int4=0.5*h*sum4
-----------------------------------------------------------------------%
------
;h=(b-a)/N
z1=((0.0001^-2)./((1-
(1/6.28)).*sqrt(10000*x2)+(1/6.28).*(sqrt(10000*x2+6.28))).*(1/sqrt(6
;(((.28).*exp(-0.5*(x2*10000))*2*10000*k4*exp(-k4*0.0001^-2
z2=((0.0001^-2)./((1-
(1/6.28)).*sqrt(x2)+(1/6.28).*(sqrt(x2+6.28))).*(1/sqrt(6.28).*exp(-
;(((0.5*(x2))*2*k4.*exp(-k4

;sum1=z1+z2

for i=1:N-1
sum2=((a+i*h).^-2)./((1-(1/2*pi)).*(sqrt(x2.*(a+i*h).^-1))
+(1/6.28).*(sqrt(x2*((a+i*h).^-1)+6.28)).*(1/sqrt(6.28).*(exp(-
;(((0.5*x2.*(a+i*h).^-1))*2*k4*((a+i*h).^-1).*exp(-k4*(a+i*h).^-2
end
;sum3=2*sum2
;sum4=sum1+sum3
```

```
;int5=0.5*h*sum4
;(int6=(int5+int4
;int7=(int6+int3)*0.5

;Pe=int7


;('semilogy(SNR1,Pe,'b
;hold on
```