

%% Constands

% Inputs, Outputs

Input\_dBm=[-11,-10,-9,-8,-7,-6,-5,-4,-3,-2,-1,0,1,2,3,4,5,6,7,8,9,10];

Output\_available\_uPower=[3.78206478122059,5.75999999438698,7.96038996034141,11.0013555966224,15.2040070356233,21.0121223615618,29.0390082760932,40.1322620889368,55.4632735753951,76.6509176303600,105.932499018282,146.400000093588,187.300878345750,239.628545127481,306.575389005463,392.225680349766,501.804743116857,641.997739643223,821.357516764296,1050.82639499653,1344.40373392028,1720.00000036615];

Pharv=Output\_available\_uPower;

% Xbee constands (T:ms, and P: micro Power(uPower) )

Tb=12.98;Tbet=13.1;Tnbt=22; % ms

Ps=3.3;Pb=56.3069E+3;Pbet=63.303E+3;Pnbt=91.7352E+3; % micro power (uP)

%%%%%

%%%%%

%% Beacon - Enable Network

for i=1:length( Pharv ) % harvesting values

for n=0:999 % beacon quantity in a period

% T beacon enable total sleep (ms) = n\*Ts1 + Ts2

Tbets((n+1),i)= ( n\*Tb\*(Pb-Pharv(i))+Tbet\*(Pbet-Pharv(i) ) )./( Pharv(i)-Ps );

Tbep ((n+1),i) = n\*Tb+Tbets((n+1),i)+Tbet;

Comm\_be\_minute((n+1),i)=1000/Tbep ((n+1),i);

Comm\_be\_hour((n+1),i)=(1000\*60)/Tbep ((n+1),i);

Comm\_be\_day((n+1),i)=(1000\*60\*24)/Tbep ((n+1),i);

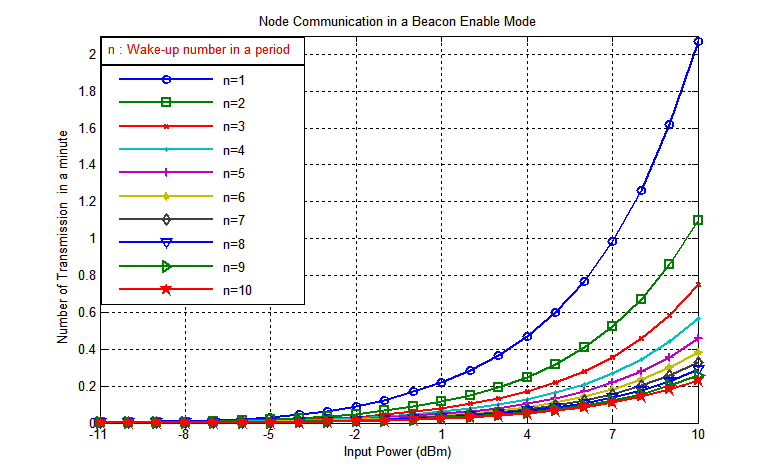
Comm\_be\_week((n+1),i)=(1000\*60\*24\*7)/Tbep ((n+1),i);

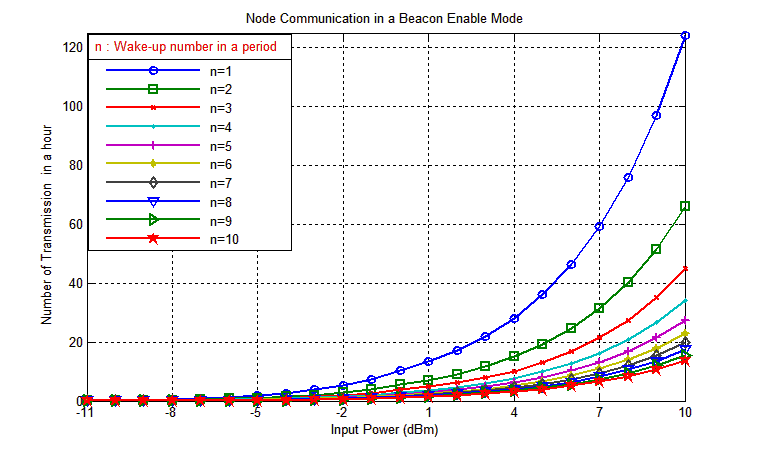
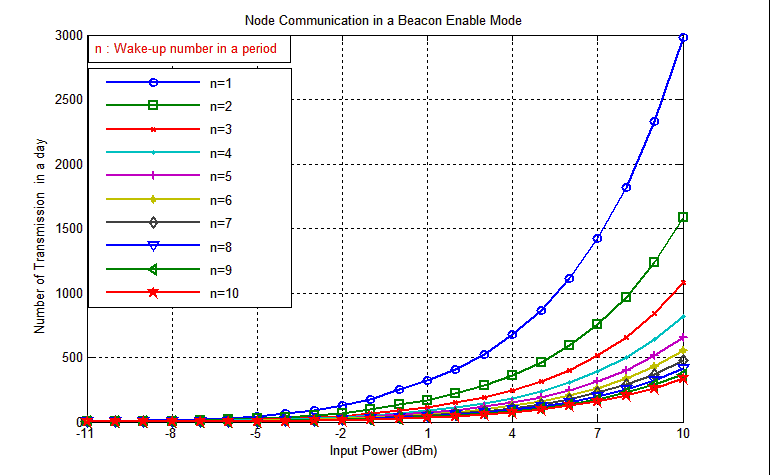
Comm\_be\_mouth((n+1),i)=(1000\*60\*24\*30)/Tbep ((n+1),i);

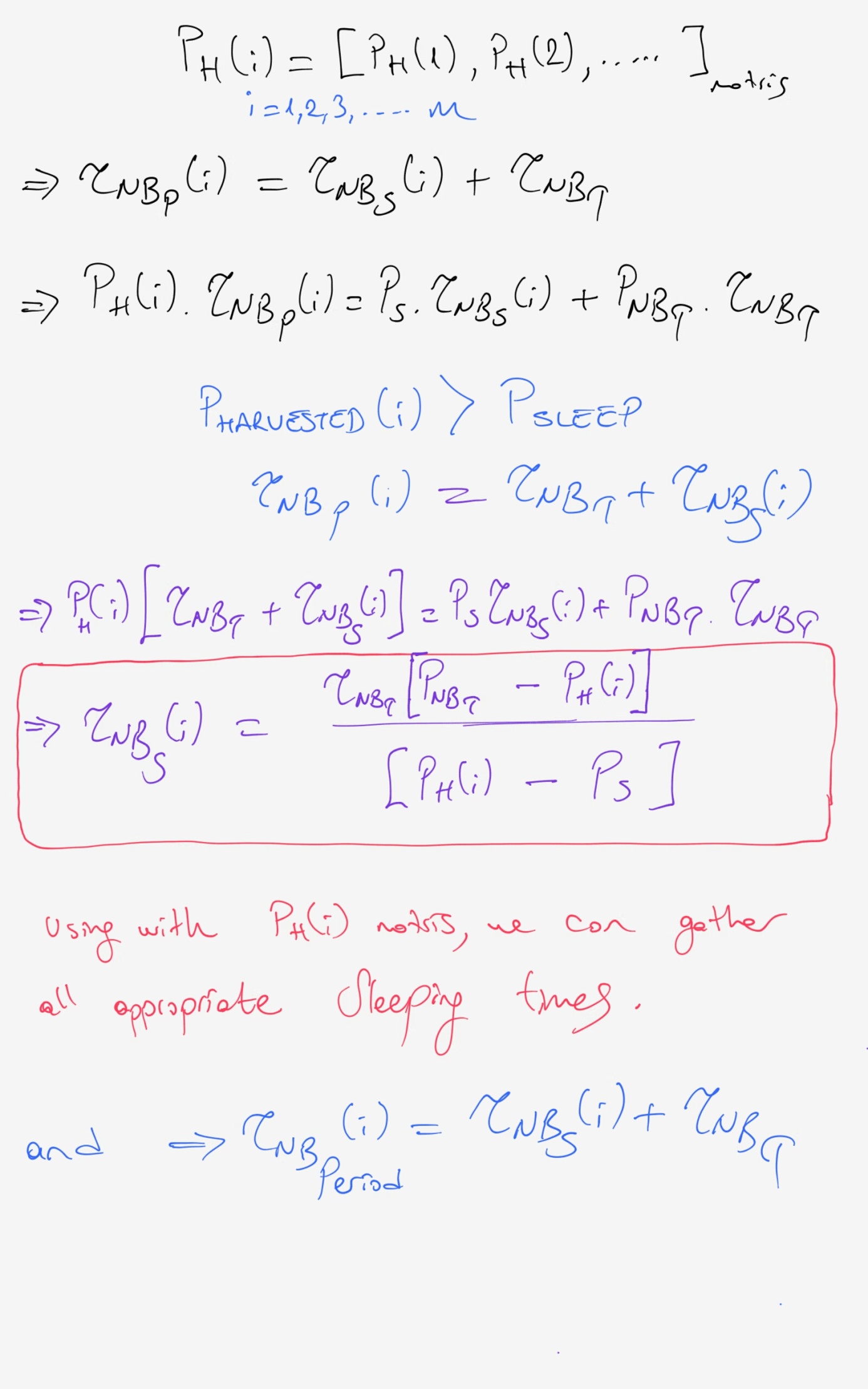
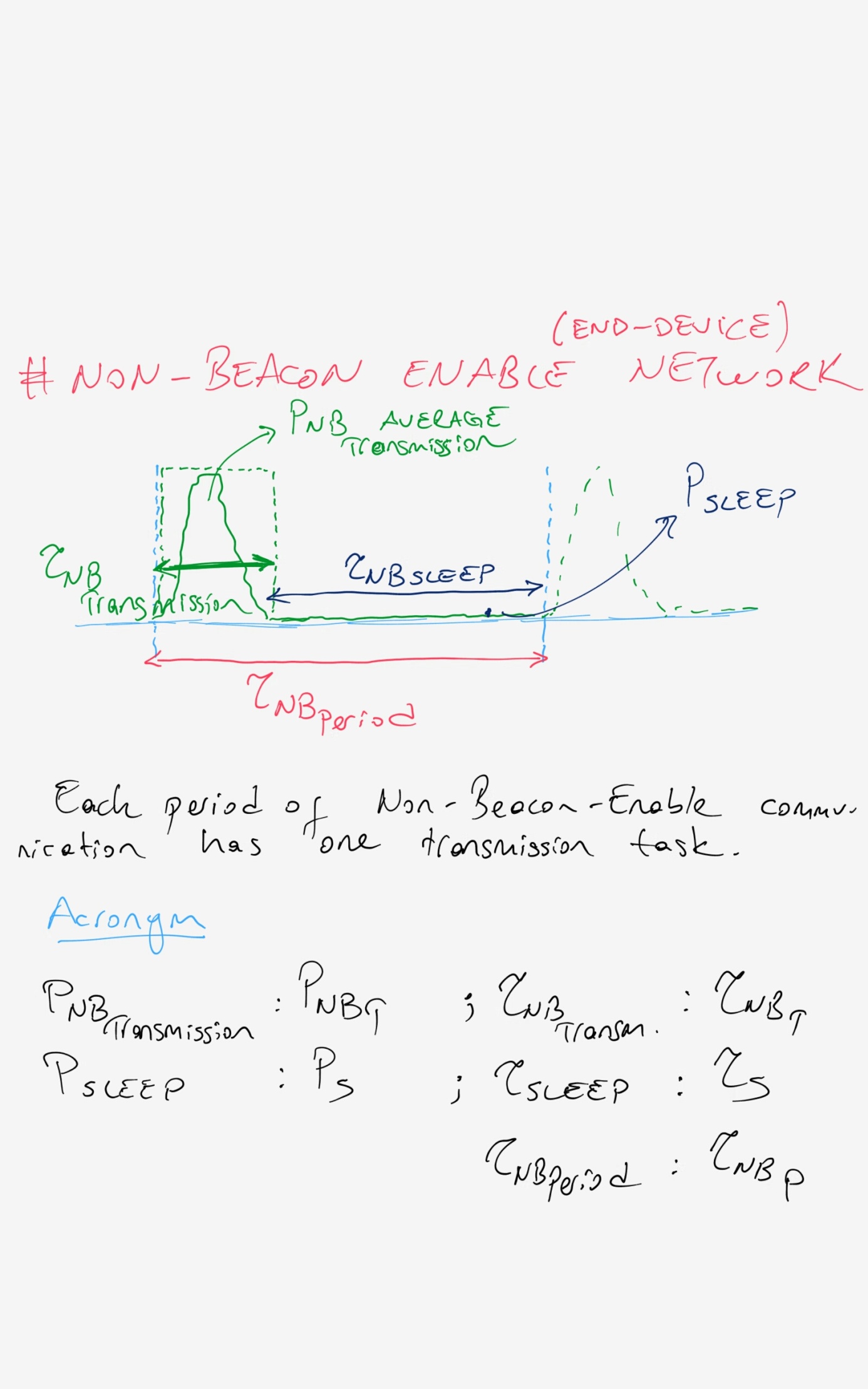
Comm\_be\_year((n+1),i)=(1000\*60\*24\*365)/Tbep ((n+1),i);

end

end





%% NoN-Beacon-Enable

for i=1:length(Pharv)

Tnbs(i)= Tnbt\*(Pnbt-Pharv(i))./( Pharv(i) - Ps ); %non-beacon sleep times, ms

Tnbp(i) = Tnbt + Tnbs(i) ;% Non-beacon period (ms)

Comm\_nb\_minute(i)=1000/Tnbp(i);

Comm\_nb\_hour(i)=(1000\*60)/Tnbp(i);

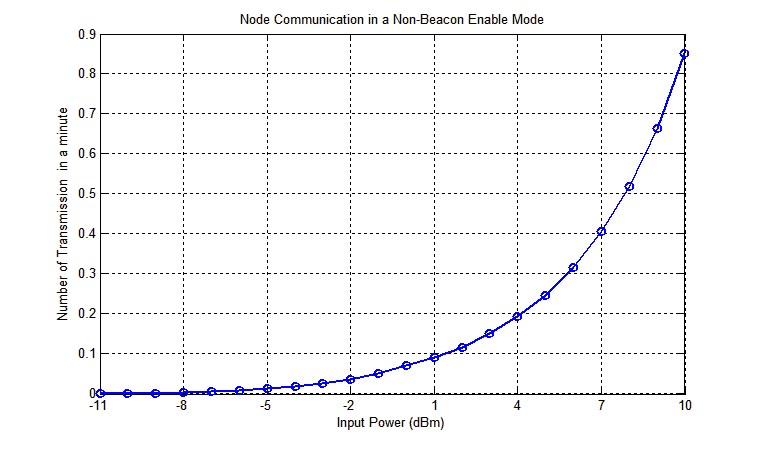
Comm\_nb\_day(i)=(1000\*60\*24)/Tnbp(i);

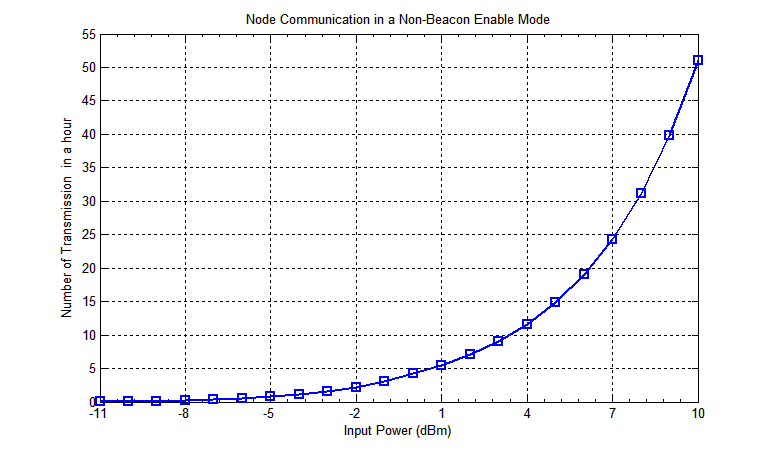
Comm\_nb\_week(i)=(1000\*60\*24\*7)/Tnbp(i);

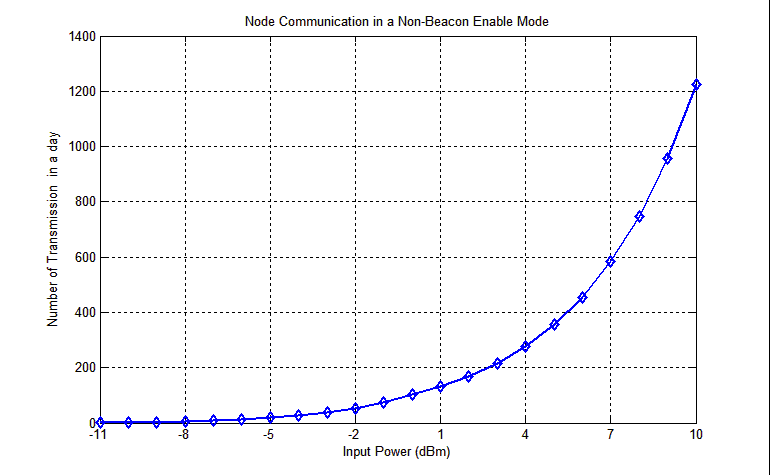
Comm\_nb\_mouth(i)=(1000\*60\*24\*30)/Tnbp(i);

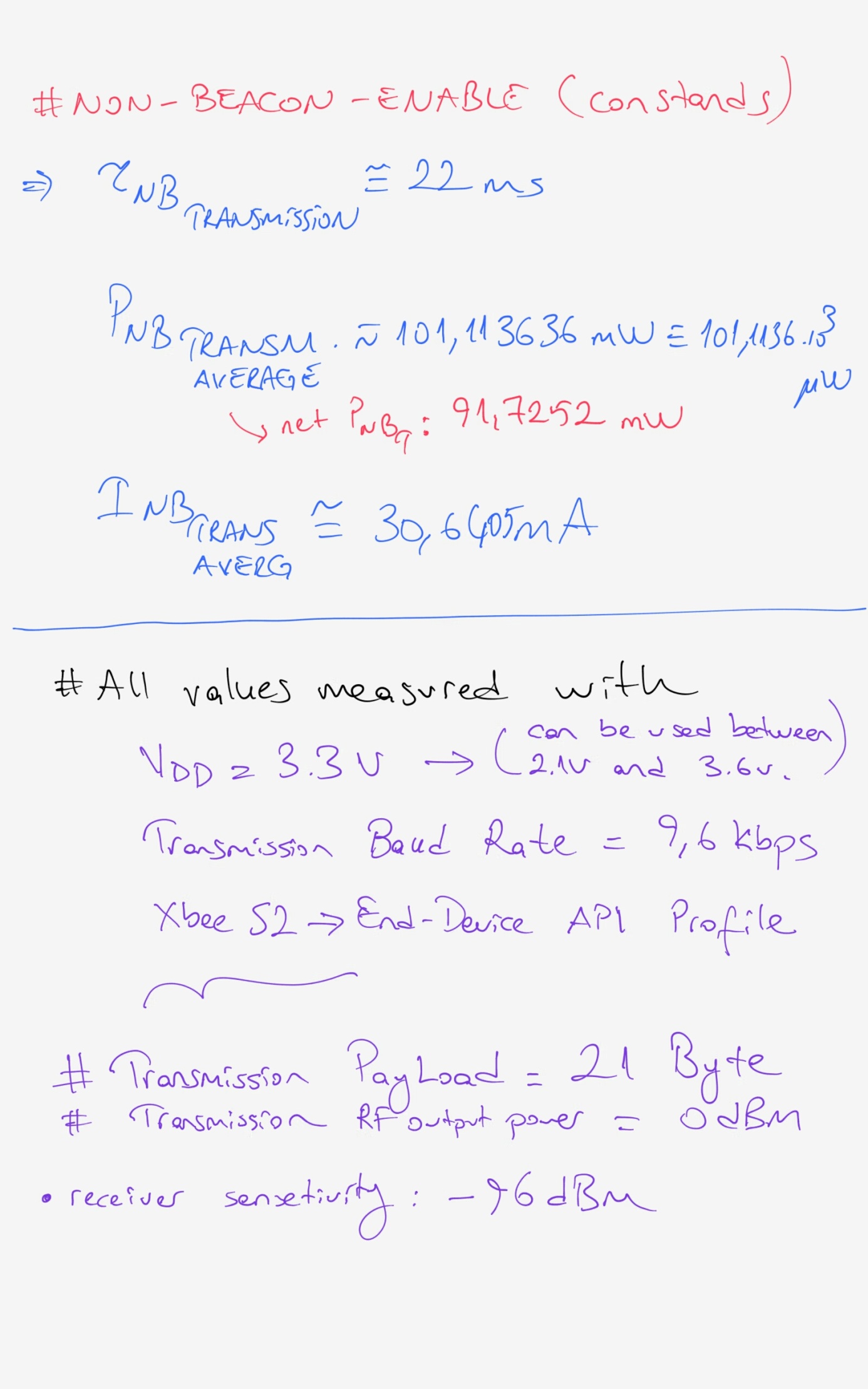
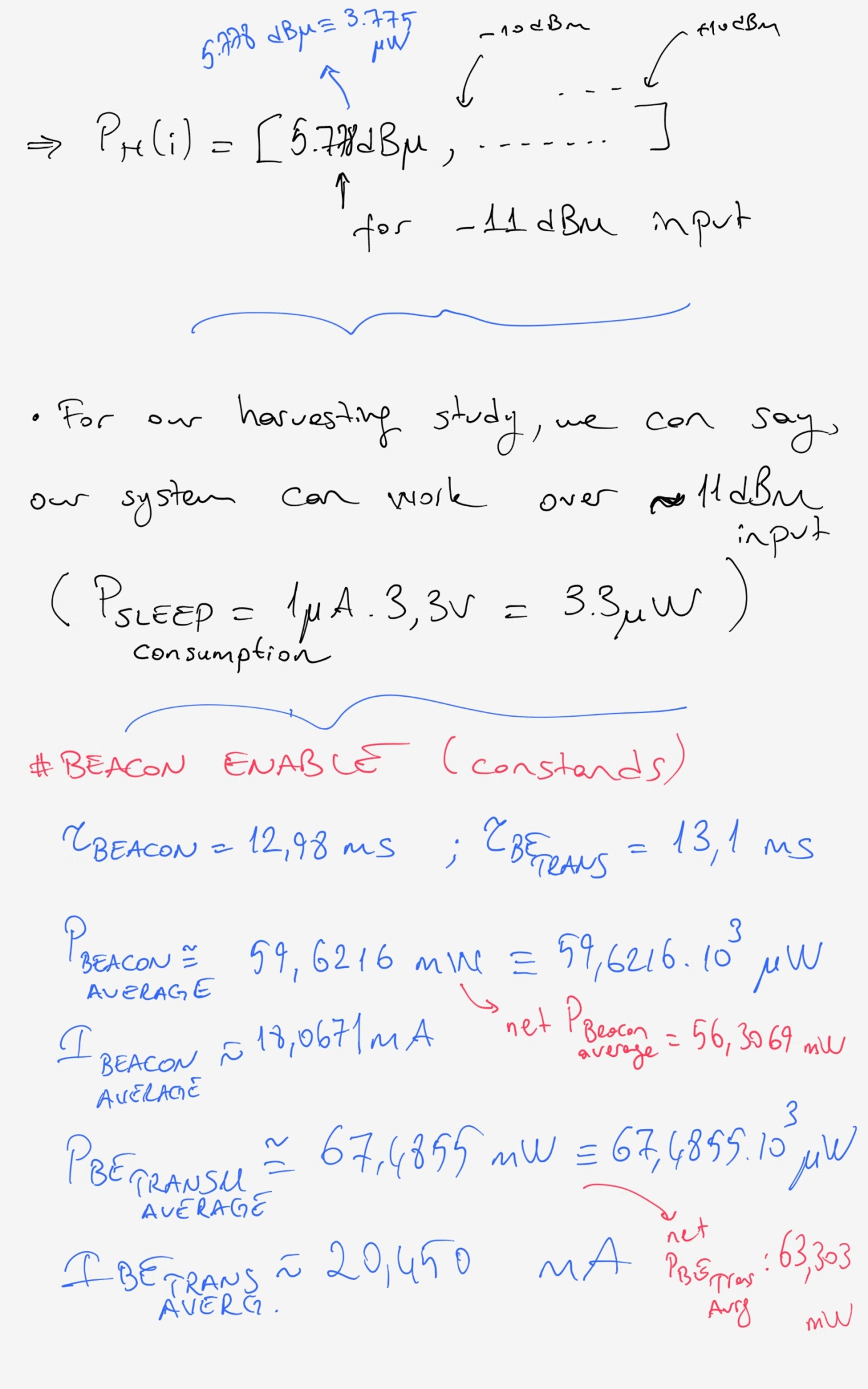
Comm\_nb\_year(i)=(1000\*60\*24\*365)/Tnbp(i);

end;









Node Communication in a Non-Beacon Enable Mode

Input Power (dBm)

Number of Transmission in a minute y= -.0001 .9