

# Power Circle Diagram

This program plots a power circle diagram using given Values of  $V_s$ ,  $V_r$ ,  $A$  and  $B$  and plots the sending end and receiving end graphs on a single figure.

## Way of giving input

All the Values are Complex, so the Sending End and Receiving End Volages should be pre adjusted before giving any input to eliminate the error in the circle diagram location in the  $a + bi$  format. The Values of the  $A$  and  $B$  parameter is to be given in the  $a + bi$  format

```
%-----Input Section-----
Vs = input('Enter Vs in (a + bi) form : ');
%Taking Inputs for the Sending end voltage vector
Vr = input('Enter Vr in (a + bi) form : ');
%taking input for the Receiving end voltage Vector
A = input('Enter the A Parameter in (a + bi) form : ');
%Takng input for the A parameter of the line
B = input('Enter the B Parameter in (a + bi) form : ');
%Taking input for the B parameter of the line

% Processing section

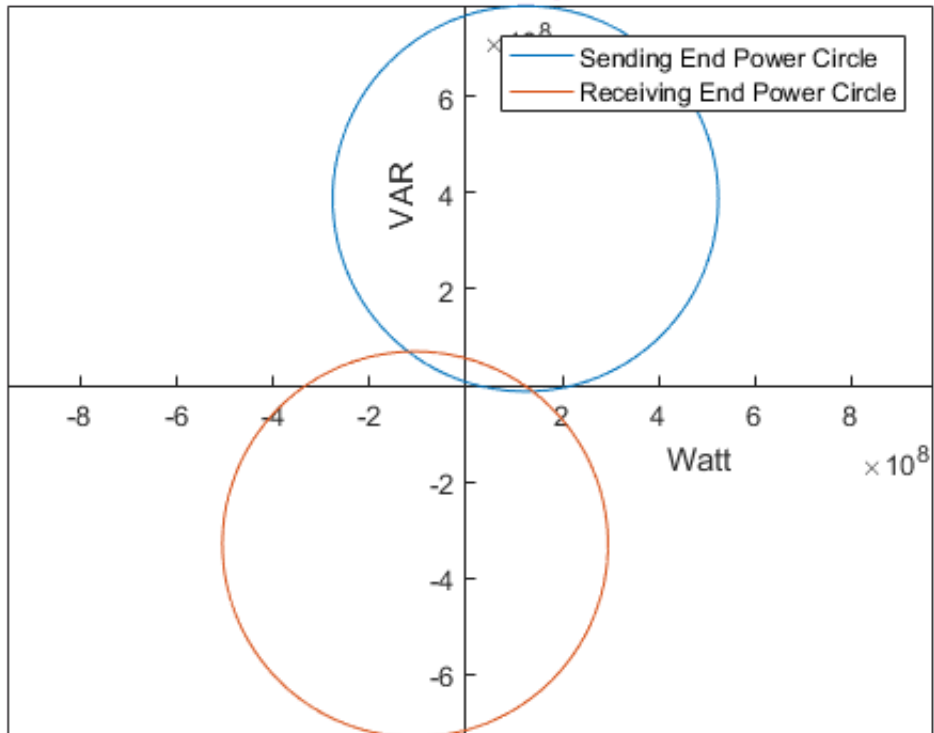
R = (abs(Vs)*abs(Vr))/abs(B);
% Calculation of radius of the Power Circle
CntrR = (abs(A)*abs(Vr)*abs(Vr))/abs(B);
CntrS = (abs(A)*abs(Vs)*abs(Vs))/abs(B);
% Calculation of the Centre of the power circle

% Plotting Section

th = linspace( 0, 2*pi , 3600);
% Threshold of the receiving end power Circle
x = R*cos(th) + CntrS*cos(angle(B));
y = R*sin(th) + CntrS*sin(angle(B));
plot(x,y,'DisplayName','Sending End Power Circle')
% Plotted the Sending end circle
hold on
x1 = R*cos(th) - CntrR*cos(angle(B));
y1 = R*sin(th) - CntrR*sin(angle(B));
% Plotted the Receiving end circle
plot(x1,y1,'DisplayName','Receiving End Power Circle')

% Plot Formatting Section
legend('show')
axis equal % plotting the x,y plot with equal axis ratios
ax = gca; % creating the axes
ax.XAxisLocation = 'origin';
ax.YAxisLocation = 'origin';
title('Power Circle Diagrams');
xlabel('Watt');
ylabel('VAR');
```

### Power Circle Diagrams



The Values taken for this plot are

1.  $V_s = 238540 \text{ V}$
2.  $V_r = 220000 \text{ V}$
3.  $A = 0.9378 + 0.019i$
4.  $B = 39.89 + 124.99i\Omega$