% "RF impedance response of metal film resistor"

close all; % close all opened graphs

figure; % open new graph

sigma\_Cu=64.516e6; % define material conductivity

mu=4\*pi\*1e-7; % permeability of free space

% define constants for this example

R=500; % resistance in Ohms

C=5e-12; % capacitance in Farads

l=0.025; % length of leads in meters

a=2.032e-4; % radius of the leads in meters (AWG 26)

% define frequency range

f\_min=1e6; % lower frequency limit

f\_max=1000e9; % upper frequency limit

N=300; % number of points in the graph

f=f\_min\*((f\_max/f\_min).^((0:N)/N)); % compute frequency points on log scale

L=2\*l/(4\*pi\*a)\*sqrt(mu./(pi\*sigma\_Cu\*f)); % determine inductance

Z=1./(j\*2\*pi\*f\*C+1/R)+j\*2\*pi\*f.\*L; % determine impedance

loglog(f,abs(Z));

title('Impedance of a 500 {\Omega} thin-film resistor as a function of frequency');

xlabel('Frequency {\itf}, Hz');

ylabel('Impedance |Z|, {\Omega}');