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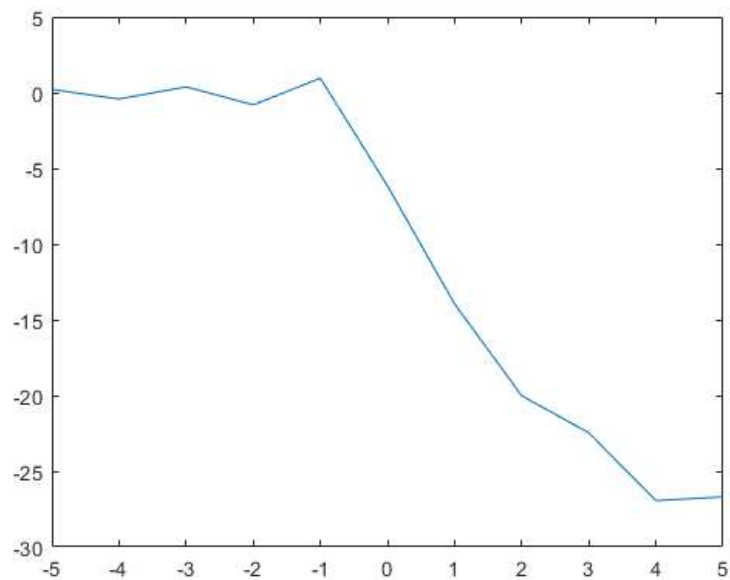
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```
clc;
clear;
close all;
```

Exact equation of Gd

```
mue = -5:5; %value of nu
inde = 0;
for vmuer = -5:5
    inde = inde + 1;
    intFe = integral(@(x) exp((-1j*pi*x.^2)/2), vmuer, 20); % Integration of the function used in integral part of Complex Fresnel integral
    fe = abs((0.5 + 0.5*1j) * intFe); % Complex Fresnel integral
    Gdb_e(inde) = 20*log10(fe); % Diffraction Gain in dB
end

figure;
plot(mue, Gdb_e, 'DisplayName', 'Exact Gd');
hold on;
```



Approximate Equation of Gd

```
i = 0;
LL = -5; %lower limit
UL = 5; %upper limit
v = LL:UL;

for vn = LL:UL
    i = i + 1;
    if vn < -1.0
        Gdb(i) = 0;
    elseif vn <= 0
        Gdb(i) = 20*log10(0.5 - 0.62*vn);
    elseif vn <= 1
        Gdb(i) = 20*log10(0.5 * exp(-0.95*vn));
    elseif vn <= 2.4
        Gdb(i) = 20*log10(0.4 - sqrt(0.1184 - (0.38 - 0.1*vn).^2));
    else
        Gdb(i) = 20*log10(0.225 / vn);
    end
end
```

```
plot(v, Gdb, 'DisplayName', 'Approximate Gd');  
xlabel('x (Fresnel-Differential Parameter V)');  
ylabel('y (Knife-Edge Differential Gain Gd[dB])');  
title('Integrated Diffraction Gain Plot');  
legend('show');  
grid on;
```

