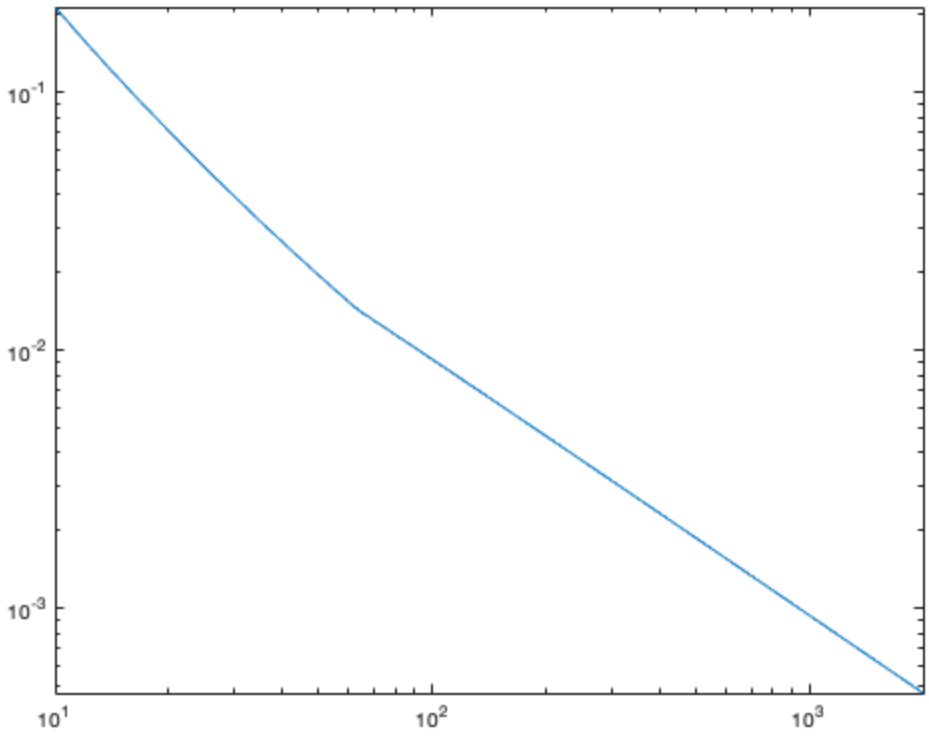
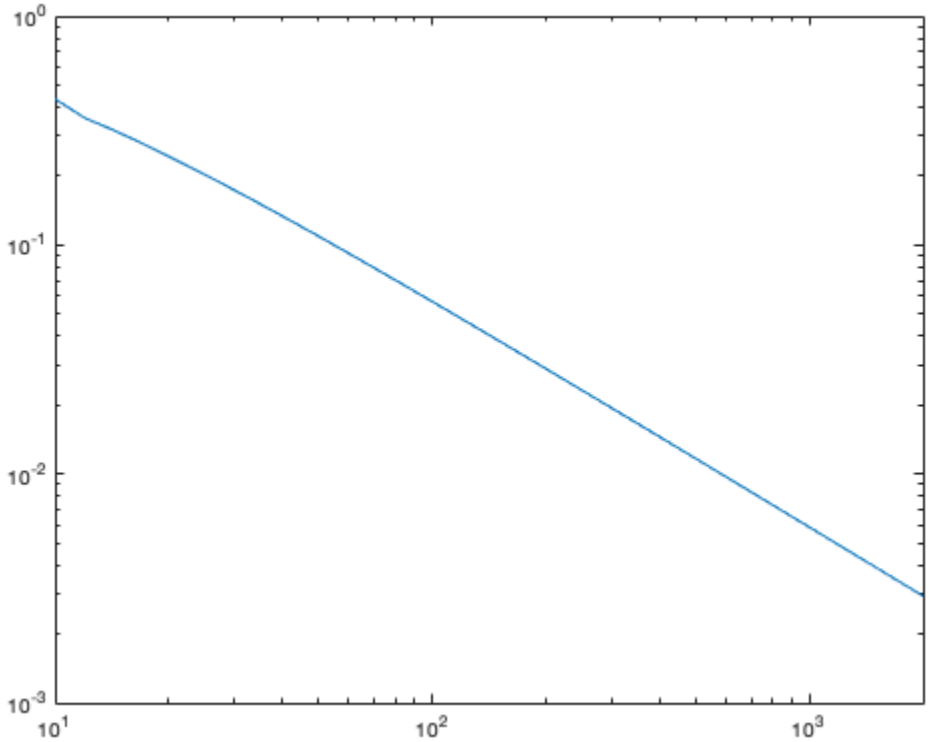
```
u1 = @(x) sin(abs(x-pi)).^3;
u2 = @(x) exp(sin(x));
f1 = @(x) 10.*sin(abs(x-pi)).^3-6.*sin(abs(x-pi));
f2 = @(x) exp(sin(x)).*(sin(x).^2+sin(x));

diff1s = [];
diff2s = [];

for N=10:2:2000
    xvals = linspace(0,2.*pi,N);
    k=[0:N/2-1, 0, -N/2+1:-1];
    f1ys = f1(xvals);
    f2ys = f2(xvals);
    f1fft = fft(f1ys);
    f1sol = ifft(f1fft./(1+k.^2));
    f2fft = fft(f2ys);
    f2sol = ifft(f2fft./(1+k.^2));
    diff1s = [diff1s max(abs(u1(xvals)-f1sol))];
    diff2s = [diff2s max(abs(u2(xvals)-f2sol))];
end

index = linspace(10,2000,996);
figure;
loglog(index, diff1s);
figure;
loglog(index, diff2s);
```


10^{-1}
10^{-2}
10^{-3}
10^{1}
10^{2}
10^{3}


10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{1}
10^{2}
10^{3}

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