

# DTFT Octave Codes (4A)

---

Copyright (c) 2009 - 2018 Young W. Lim.

Permission is granted to copy, distribute and/or modify this document under the terms of the GNU Free Documentation License, Version 1.2 or any later version published by the Free Software Foundation; with no Invariant Sections, no Front-Cover Texts, and no Back-Cover Texts. A copy of the license is included in the section entitled "GNU Free Documentation License".

Please send corrections (or suggestions) to [youngwlim@hotmail.com](mailto:youngwlim@hotmail.com).

This document was produced by using LibreOffice and Octave.

---

Based on  
M.J. Roberts, Fundamentals of Signals and Systems

# Normalized $\omega_s$ and $\omega_0$

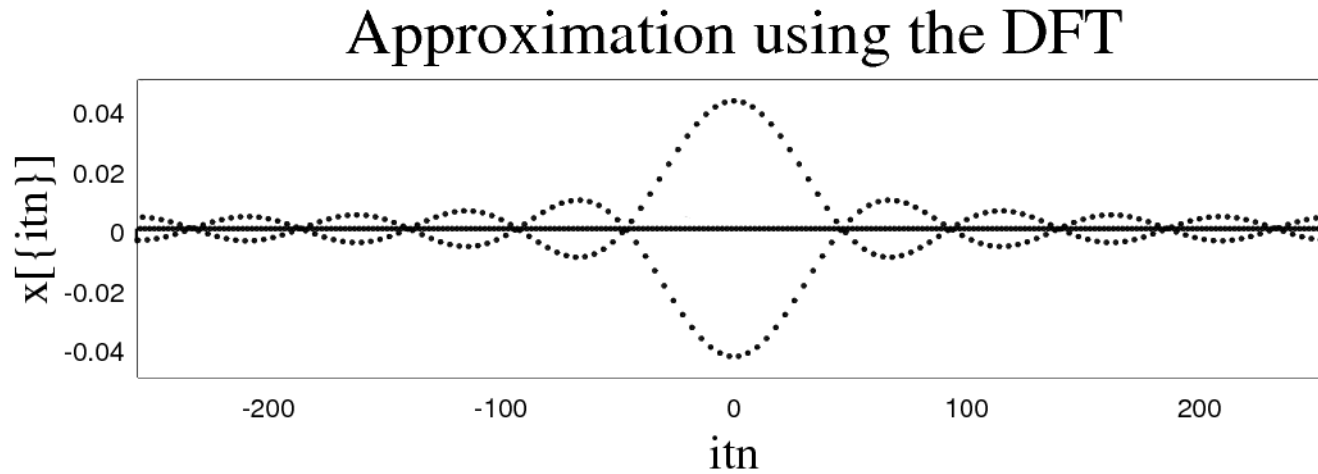
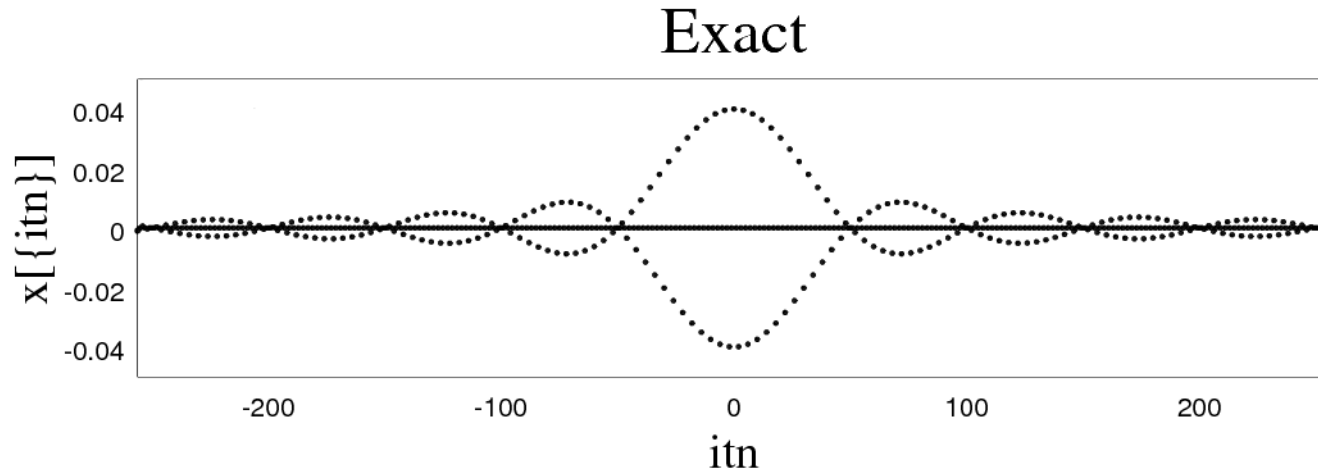
```
NF = 512;  
k = [0:NF-1]';  
  
X = rect(50*(k/NF-1/4)) + rect(50*(k/NF-3/4));  
  
xa = real(fftshift(iff(X)));  
n = [-NF/2:NF/2-1]';  
  
xe = sinc(n/50).*cos(pi*n/2)/25;
```

# Normalized $\omega_s$ and $\omega_0$

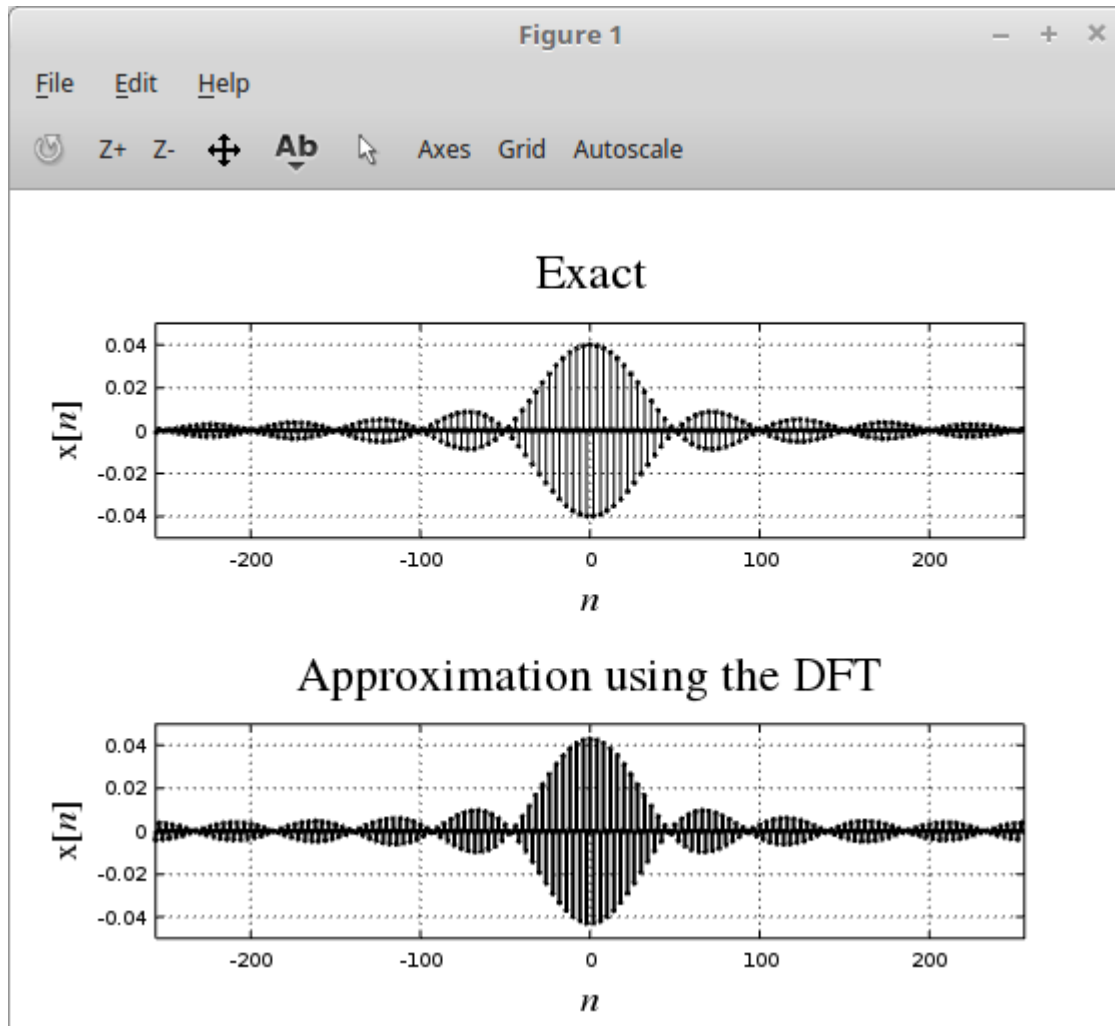
```
subplot(2,1,1);  
p = stem(n,xe,'k','filled');  
set(p,'LineWidth',1,'MarkerSize',2);  
axis([-NF/2,NF/2,-0.05,0.05]); grid on;  
xlabel('\itn','FontName','Times','FontSize', 18);  
ylabel('x[{\itn}]','FontName','Times','FontSize',18);  
title('Exact','FontName','Times', 'FontSize', 24);
```

```
subplot(2,1,2);  
p = stem(n,xa,'k','filled');  
set(p,'LineWidth',2,'MarkerSize',2);  
axis([-NF/2,NF/2,-0.05,0.05]); grid on;  
xlabel('\itn','FontName','Times','FontSize', 18);  
ylabel('x[{\itn}]','FontName','Times','FontSize',18);  
title('Approximation using the DFT','FontName','Times',  
'FontSize', 24);
```

# Normalized $\omega_s$ and $\omega_0$



# Normalized $\omega_s$ and $\omega_0$



---

## References

- [1] <http://en.wikipedia.org/>
- [2] J.H. McClellan, et al., Signal Processing First, Pearson Prentice Hall, 2003
- [3] M.J. Roberts, Fundamentals of Signals and Systems
- [4] S.J. Orfanidis, Introduction to Signal Processing
- [5] K. Shin, et al., Fundamentals of Signal Processing for Sound and Vibration Engineerings
  
- [6] A “graphical interpretation” of the DFT and FFT, by Steve Mann