**Unit Sample Sequence**

function [x,n] = impseq(n0,n1,n2)

% Generates x(n) = delta(n-n0); n1 <= n <= n2

% ----------------------------------------------

% [x,n] = impseq(n0,n1,n2)

%

n = [n1:n2]; x = [(n-n0) == 0];

Hs = stem(n,x,'b','filled'); % Stem-plot with handle Hs

set(Hs,'markersize',4); % Change circle size

xlabel('n'); ylabel('x(n)'); % Label axis

title('Unit Sample Sequence'); % Title plot

**Unit Step Sequence**

function [x,n] = stepseq(n0,n1,n2)

% Generates x(n) = u(n-n0); n1 <= n <= n2

% ------------------------------------------

% [x,n] = stepseq(n0,n1,n2)

%

n = [n1:n2]; x = [(n-n0) >= 0];

Hs = stem(n,x,'b','filled'); % Stem-plot with handle Hs

set(Hs,'markersize',4); % Change circle size

xlabel('n'); ylabel('x(n)'); % Label axis

title('Unit Step Sequence'); % Title plot

**Real Value Exponential Sequence**

function [x,n] = real\_value(a,n1,n2)

% Generates x(n) = a^n; n1 <= n <= n2

% -----------------------------------

% [x,n] = real\_value(a,n1,n2)

%

n = [n1:n2]; x = [(n-n0) >= 0];

Hs = stem(n,x,'b','filled'); % Stem-plot with handle Hs

set(Hs,'markersize',4); % Change circle size

xlabel('n'); ylabel('x(n)'); % Label axis

title('Real Value Exp. Sequence'); % Title plot

**Sinusoidal Sequence**

function [x,n] = sinusoidal(A,omega0,theta0,n1,n2)

% Generates x(n) = Acos(omega0\*n + theta0); n1 <= n <= n2

% -------------------------------------------------------

% [x,n] = sinusoidal(A,omega0,theta0,n1,n2)

%

n = [n1:n2]; x = A\*cos(omega0\*n + theta0);

Hs = stem(n,x,'b','filled'); % Stem-plot with handle Hs

set(Hs,'markersize',4); % Change circle size

xlabel('n'); ylabel('x(n)'); % Label axis

title('Sinusoidal Sequence'); % Title plot

**Gaussian Random Sequence**

function [x,n] = random\_gaussian(N)

% Generates x(n) = randn(1,N)

% ---------------------------------------

% [x,n] = random\_gaussian(N)

%

n = [1:N]; x = rand(1,N);

Hs = stem(n,x,'b','filled'); % Stem-plot with handle Hs

set(Hs,'markersize',4); % Change circle size

xlabel('n'); ylabel('x(n)'); % Label axis

title('Random Gaussian Sequence'); % Title plot

**Signal Addition**

function [y,n] = sigadd(x1,n1,x2,n2)

% implements y(n) = x1(n)+x2(n)

% -----------------------------

% [y,n] = sigadd(x1,n1,x2,n2)

% y = sum sequence over n, which includes n1 and n2

% x1 = first sequence over n1

% x2 = second sequence over n2 (n2 can be different from n1)

%

n = min(min(n1),min(n2)):max(max(n1),max(n2)); % duration of y(n)

y1 = zeros(1,length(n)); y2 = y1; % initialization

y1(find((n>=min(n1))&(n<=max(n1))==1))=x1; % x1 with duration of y

y2(find((n>=min(n2))&(n<=max(n2))==1))=x2; % x2 with duration of y

y = y1+y2; % sequence addition

Hs = stem(n,y,'b','filled'); % Stem-plot with handle Hs

set(Hs,'markersize',4); % Change circle size

xlabel('n'); ylabel('y(n)'); % Label axis

title('Sum Sequence'); % Title plot

**Signal Multiplication**

function [y,n] = sigmult(x1,n1,x2,n2)

% implements y(n) = x1(n)\*x2(n)

% -----------------------------

% [y,n] = sigmult(x1,n1,x2,n2)

% y = product sequence over n, which includes n1 and n2

% x1 = first sequence over n1

% x2 = second sequence over n2 (n2 can be different from n1)

%

n = min(min(n1),min(n2)):max(max(n1),max(n2)); % duration of y(n)

y1 = zeros(1,length(n)); y2 = y1; %

y1(find((n>=min(n1))&(n<=max(n1))==1))=x1; % x1 with duration of y

y2(find((n>=min(n2))&(n<=max(n2))==1))=x2; % x2 with duration of y

y = y1 .\* y2; % sequence multiplication

Hs = stem(n,y,'b','filled'); % Stem-plot with handle Hs

set(Hs,'markersize',4); % Change circle size

xlabel('n'); ylabel('y(n)'); % Label axis

title('Product Sequence'); % Title plot

**Signal Shift**

function [y,n] = sigshift(x,m,k)

% implements y(n) = x(n-k)

% -------------------------

% [y,n] = sigshift(x,m,k)

%

n = m+k; y = x;

Hs = stem(n,y,'b','filled'); % Stem-plot with handle Hs

set(Hs,'markersize',4); % Change circle size

xlabel('n'); ylabel('y(n)'); % Label axis

title('Shifted Sequence'); % Title plot

**Signal Folded**

function [y,n] = sigfold(x,n)

% implements y(n) = x(-n)

% -----------------------

% [y,n] = sigfold(x,n)

%

y = fliplr(x); n = -fliplr(n);

Hs = stem(n,y,'b','filled'); % Stem-plot with handle Hs

set(Hs,'markersize',4); % Change circle size

xlabel('n'); ylabel('y(n)'); % Label axis

title('Folded Sequence'); % Title plot

**Signal Scaling**

function [y,n] = sigscaling(a,x)

% implements y(n) = a{x(n)}

%-------------------------------

% [y,n] = (a,x)

%

n = [1:length(x)]; y = a\*x;

Hs = stem(n,y,'b','filled'); % Stem-plot with handle Hs

set(Hs,'markersize',4); % Change circle size

xlabel('n'); ylabel('y(n)'); % Label axis

title('Scaling Sequence'); % Title plot