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function [X] = my_dit_fft(x,N)

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% ALGORITHM : This function will calculate the Radix-2 dit
% ( decimation in
% time ) fft for a sequence x[n]
% It divides the x[n] into sequeunce of EVEN and ODD sequeunces and
% calculate
% their N/2 point DFT separately. Lastly , it combines the calculated
% DFT
% to get the final answer of DFT.

X = zeros(1,N); % Output variable to store the calculated DFT
f1 = zeros(1,N/2); % To store the ODD parts of sequence x[n]
f2 = zeros(1,N/2); % To store the EVEN parts of sequence x[n]
Wn = exp(-1j*2*pi/N); % Twiddle factor used in the calculation of DFT

% Main loop algorithm for calculation of DFT via Radix-2 FFT algorithm
for k=1:N/2
    for m=1:N/2
        f1(k) = f1(k) + (x(2*(m-1)+1)*(Wn^(2*(m-1)*(k-1)))); %
        Calculation of N/2 point-DFT of ODD parts of sequeunce x[n]
        f2(k) = f2(k) + (x(2*(m-1)+2)*(Wn^(2*(m-1)*(k-1)))); %
        Calculation of N/2 point-DFT of EVEN parts of sequeunce x[n]
    end
    X(k) = f1(k) + (f2(k)*(Wn^(k-1))); % Combination of f1(k) and
    f2(k) for N-point DFT of the first half of sequeunce x[n]
    X(k+N/2) = f1(k) - (f2(k)*(Wn^(k-1))); % Combination of f1(k) and
    f2(k) for N-point DFT of the second half of sequeunce x[n]
end
end
end

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