
Problem 5

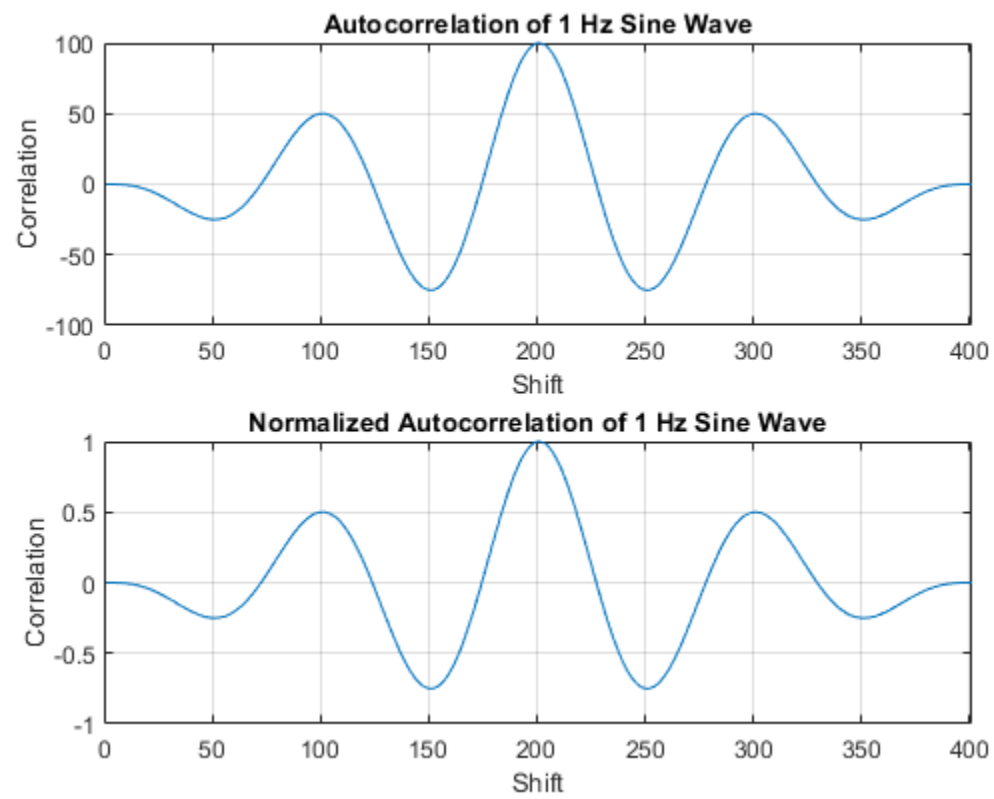
```
freq = 1;
t = -1 : 0.01 : 1;
func = sin(2*pi*freq*t);

aCorr = autoCorr(func);
aCorr_norm = aCorr/max(aCorr);

figure
subplot(2,1,1)
plot(aCorr)
title("Autocorrelation of 1 Hz Sine Wave")
grid on
xlabel("Shift")
xlim([0 2*length(func)-1])
ylabel("Correlation")
subplot(2,1,2)
plot(aCorr_norm)
title("Normalized Autocorrelation of 1 Hz Sine Wave")
grid on
xlabel("Shift")
xlim([0 2*length(func)-1])
ylabel("Correlation")

function aCorr = autoCorr(seq)

    n = length(seq);
    m = 2*n-1;
    for i = 1 : n
        aCorr(i) = sum(seq(n-i+1:n) .* seq(1:i));
        aCorr(m+1-i) = aCorr(i); % autocorrelation is symmetric
    end
end
```



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