Correlation Study of Sinusoidal Signals

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1 Frequency of Data

Frequency of Data 1 : 20,000 Hz
Frequency of Data 2 : 20,000 Hz

2 Phase Difference

Phase difference from calculated function : 45 degree
Phase difference from Correlation : 44.97 degree

3 Ratio of Time Period

Data 1 Time Period Ratio T_0/T_s : 10
Data 2 Time Period Ratio T_0/T_s : 10

4 Graph of Correlation Coefficient vs Delay parameter

The graph is oscillating at the same frequency as the data sets (20,000Hz) and converges to zero as delay parameter nears the size of dataset.

After Delay Parameter crosses the size of dataset, Correlation Coefficient becomes zero due to zero padding.

$$OscillationFrequency = 10cycles/100$$
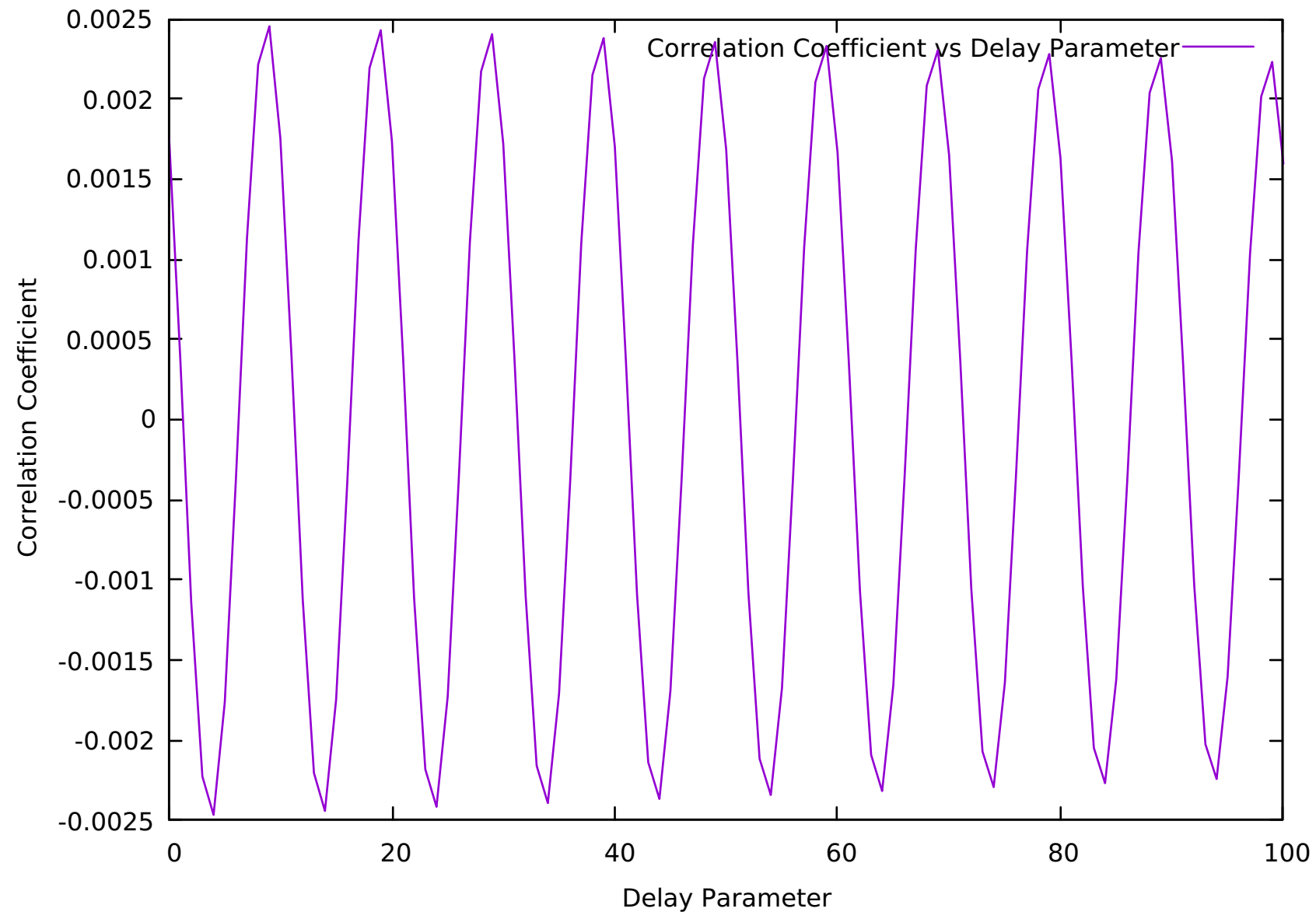$$DelayParameterResolution = Ts = 5e - 6$$

Therefore,
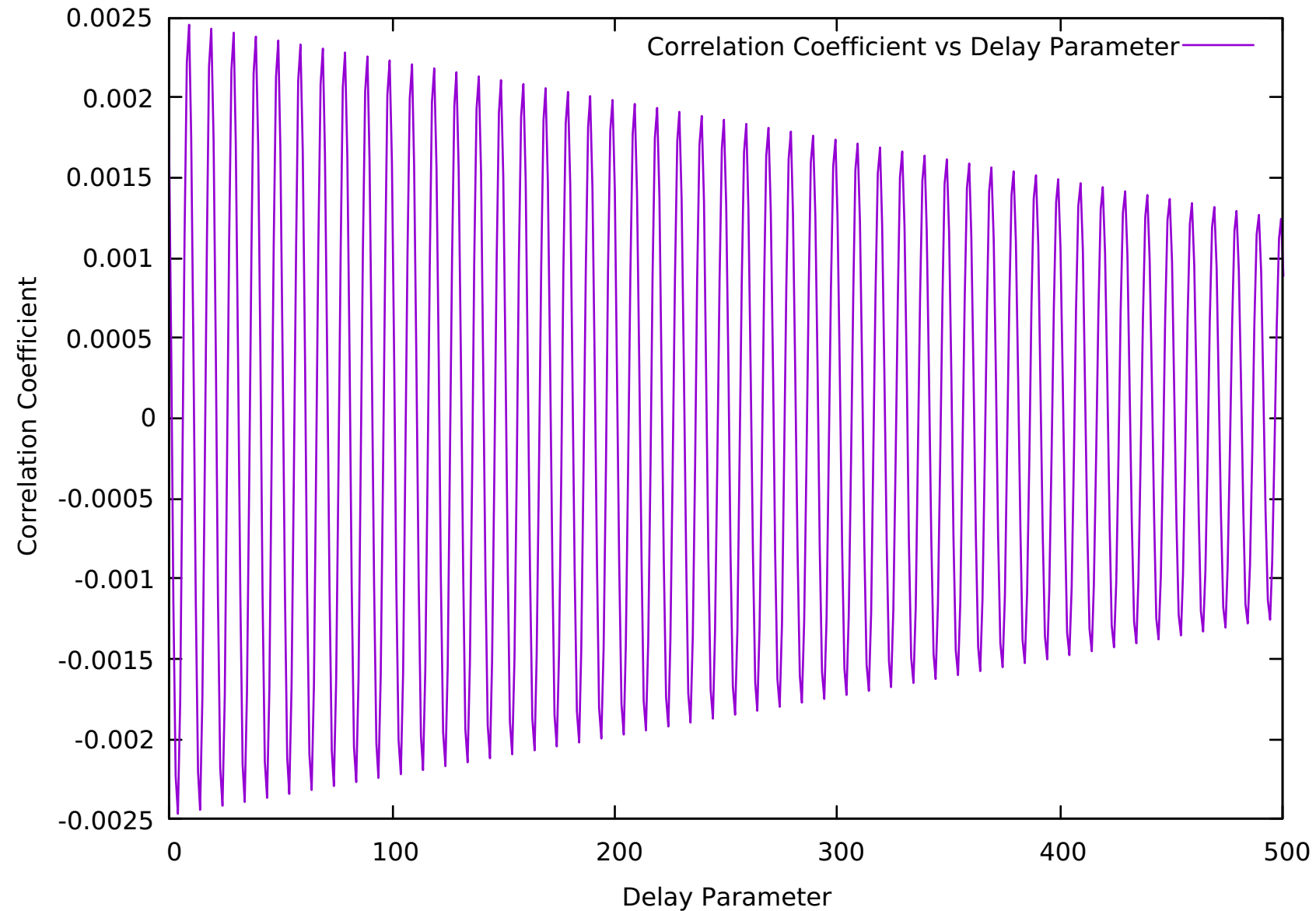$$OscillationFrequency = 10/(100 * Ts)$$

Hence,
$$OscillationFrequency = 20,000Hz$$

Correlation Coefficient vs Delay Parameter Plot

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