Options Pricing using FFT

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1 Introduction

This project will aim to research the Fast Fourier Transform algorithm and a potential use in Options Pricing.

2 Fourier Transform

The fourier series can be used to rewrite a given function in terms of a series of trigonometric functions. The equation to do so is given by:

$$f(x) = \frac{a_0}{2} + \sum_{k=1}^{\infty} a_k cos(\frac{2\pi kx}{T}) + \sum_{k=1}^{\infty} b_k sin(\frac{2\pi kx}{T})$$

for some set of Fourier coefficients a_k and b_k defined respectively:

$$a_k = \frac{2}{T} \int_0^T f(x) cos(\frac{2\pi kx}{T}) dx$$

$$b_k = \frac{2}{T} \int_0^T f(x) sin(\frac{2\pi kx}{T}) dx$$

3 Fast Fourier Transform

4 Options Pricing