Pricing exotic path-dependent options

The Singular Points method

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Overview

- Introduction
- Preliminaries
- Proof
- Summary

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Introduction

The Routh-Hurwitz test enables you to find out if a polynomial is stable without having to find all its roots.

$$p(s) = a_n s^n + a_{n-1} s^{n-1} + \ldots + a_1 s + a_0 \ (a_i \in \mathbb{R}, s_i \in \mathbb{C}) \quad (1)$$

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Example

Let's consider a simple polynomial:

$$f(s) = x^4 + 3x^3 - 5x^2 + x - 7 \tag{2}$$

To find out if this polynomial is stable we need to find its Routh-table.