

Problem set 5

Due date: Monday, November 14nd, 3:15pm.

Exercise 1

Build the implied volatility surface of the STOXX50E index using the Andreasen-Huge algorithm. The surface will contain implied vols for strikes from 40% to 200%, matching as closely as you can the market data in the spreadsheet.

First derive the implied vols for the expirations in the spreadsheet, and then for the expirations $T = 1$ and $T = 1.5$. Set $r = q = 0$.

Suppose that the stock follows a process

$$dS_t = S_t \sigma(S_t, t) dW_t \tag{1}$$

with

$$\sigma(S_t, t) = \frac{\tilde{\sigma}(S_t, t)}{S_t} \tag{2}$$

and $\tilde{\sigma}$ is a piecewise-constant function in S_t and t . Follow the steps in the paper and/or in the slides.