

## Mathematical Finance 2

### Exercise sheet 1

1. Let  $n \in \mathbb{N}$  and consider the functions

$$\varphi_n(u) = n \log \left( \frac{1}{2} e^{\frac{u}{\sqrt{n}}} + \frac{1}{2} e^{-\frac{u}{\sqrt{n}}} \right), \quad u \in \mathbb{R}.$$

Prove that  $\lim_{n \rightarrow \infty} \varphi_n(u) = \frac{1}{2} u^2$  pointwise in  $u$ .

Please read Section 1.6 of Shreve's book and then solve the following exercises. If you do not have a copy of the textbook, an extract from the first chapter is available at [http://www.mat.univie.ac.at/~finance.hp/exercisesSS13\\_MF.html](http://www.mat.univie.ac.at/~finance.hp/exercisesSS13_MF.html).

2. Solve Exercise 1.11 of Shreve's book.
3. Solve Exercise 1.14 of Shreve's book.

**Website:** [http://www.mat.univie.ac.at/~finance.hp/exercisesSS13\\_MF.html](http://www.mat.univie.ac.at/~finance.hp/exercisesSS13_MF.html)