Mathematical Finance Winter term 2023/2024
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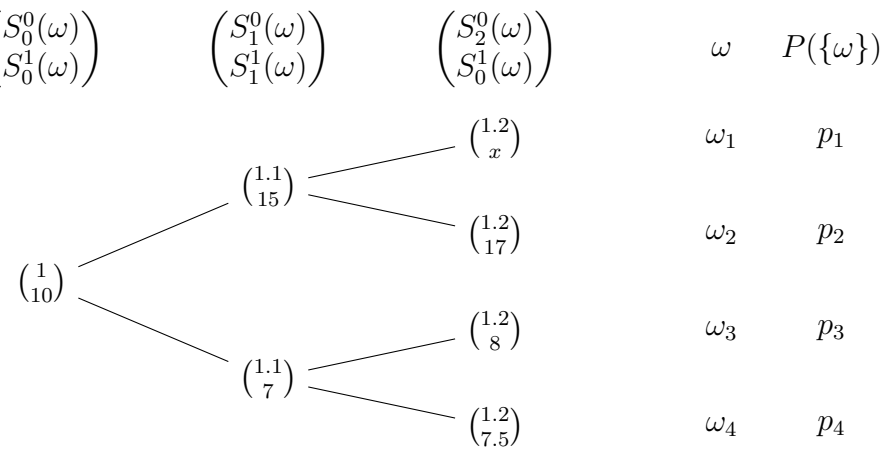
Mathematical Finance: QF

In-Tutorial exercises (for discussion on Tuesday, 28/11/2023)

In-Tutorial Exercise 1. Consider the following market with $p_1, p_2 > 0$.



a) Assume $x = 20$. Find an arbitrage strategy.

b) Find all values $x \in \mathbb{R}$ for which the market is arbitrage-free.

In-Tutorial Exercise 2. Let $S = (S^0, S^1, S^2)$ be an arbitrage-free market with $S_n^0 = (1+r)^n$, $r \geq 0$, and $S_N^2 = S_N^1 - O_0$ where O_0 is constant.

a) Show that

$$S_n^2 = S_n^1 - \frac{O_0}{(1+r)^{N-n}}, \quad n = 0, 1, \ldots, N.$$

b) What can you conclude about the fair price of a forward contract sold at time $n = 0$ with forward price O_0? What is a reasonable choice for O_0?