Homework Assignment:
The Heath-Jarrow-Morton Framework

Course: Fixed Income Derivatives

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1 One-Factor HJM Computations

Assume we have a one-factor HJM model with deterministic volatility. Compute the following quantities with respect to the risk-neutral measure $\mathbb{Q}$.

1. The expectation of the short rate, i.e.

$$\mathbb{E}^{\mathbb{Q}}\left[r_t\right].$$

2. The expectation of the bond, i.e.

$$\mathbb{E}^{\mathbb{Q}}\left[P_t^T\right].$$

3. The variance of the bond, i.e.

$$\mathrm{Var}\left[P_t^T\right].$$

2 Girsanov's Theorem

Show that the mapping $\mathbb{Q}$ as defined in Girsanov's Theorem in the lecture notes satisfies the following properties:

1. $\mathbb{Q}$ is a measure on $(\Omega, \mathcal{F})$.
2. $\mathbb{Q}$ is equivalent to $\mathbb{P}$.