

# Simulate Libor Market Model

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## 1 Model

Libor Market Model,

$$dL_n(t_i) = \mu_n L_n(t_i) dt + \sigma_n(t_i) L_n(t_i) dW_n(t_i) \quad (1)$$

Discrete form:

$$L_n(t_i + 1) = L_n(t_i) + \mu_n L_n(t_i)(t_{i+1} - t_i) + \sigma_n(t_i) L_n(t_i) \sqrt{t_{i+1} - t_i} Z_n^i \quad (2)$$

where,  $p$  is the numeraire.

$$\mu_n = \begin{cases} - \sum_{k=n+1}^p \frac{\tau_k L_n(t)}{1 + \tau_k L_n(t)} \rho_{kn} dt, n < p \\ 0, n = p \\ \sum_{k=p+1}^j \frac{\tau_k L_n(t)}{1 + \tau_k L_n(t)} \rho_{kn} dt, n > p \end{cases} \quad (3)$$

## 2 Simulation Process

Use time 0 rates to solve  $L_0(t_i)$ .

Loop all the time step

Loop Libor rates

Calculate  $\mu_n$  based on the comparison of numeraire and  $n$ .

Calculate  $L_n(t_i + 1)$   
End Libor rates  
End time step loop