Simulate Libor Market Model

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1 Model

Libor Market Model,

$$dL_n(t_i) = \mu_n L_n(t_i)dt + \sigma_n(t_i)L_n(t_i)dW_n(t_i) \tag{1}$$

Discrete form:

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

where, p is the numeraire.

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

2 Simulation Process

Use time 0 rates to solve $L_0(t_i)$.
Loop all the time step
Loop Libor rates
Calculate μ_n based on the comparsion of numeraire and n.

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