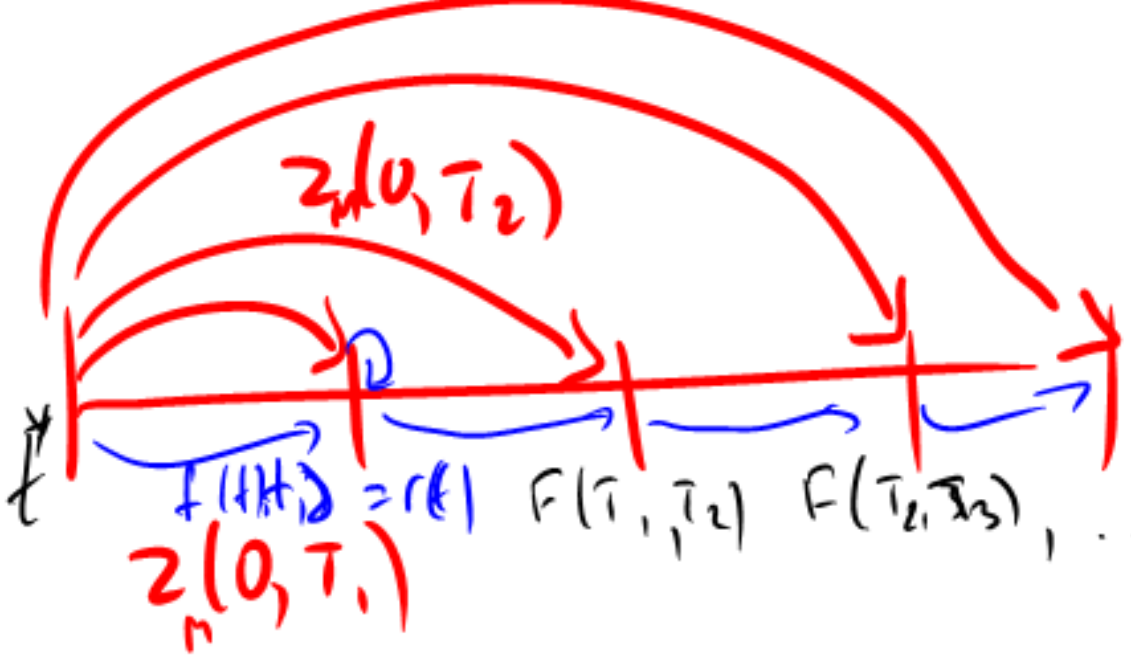
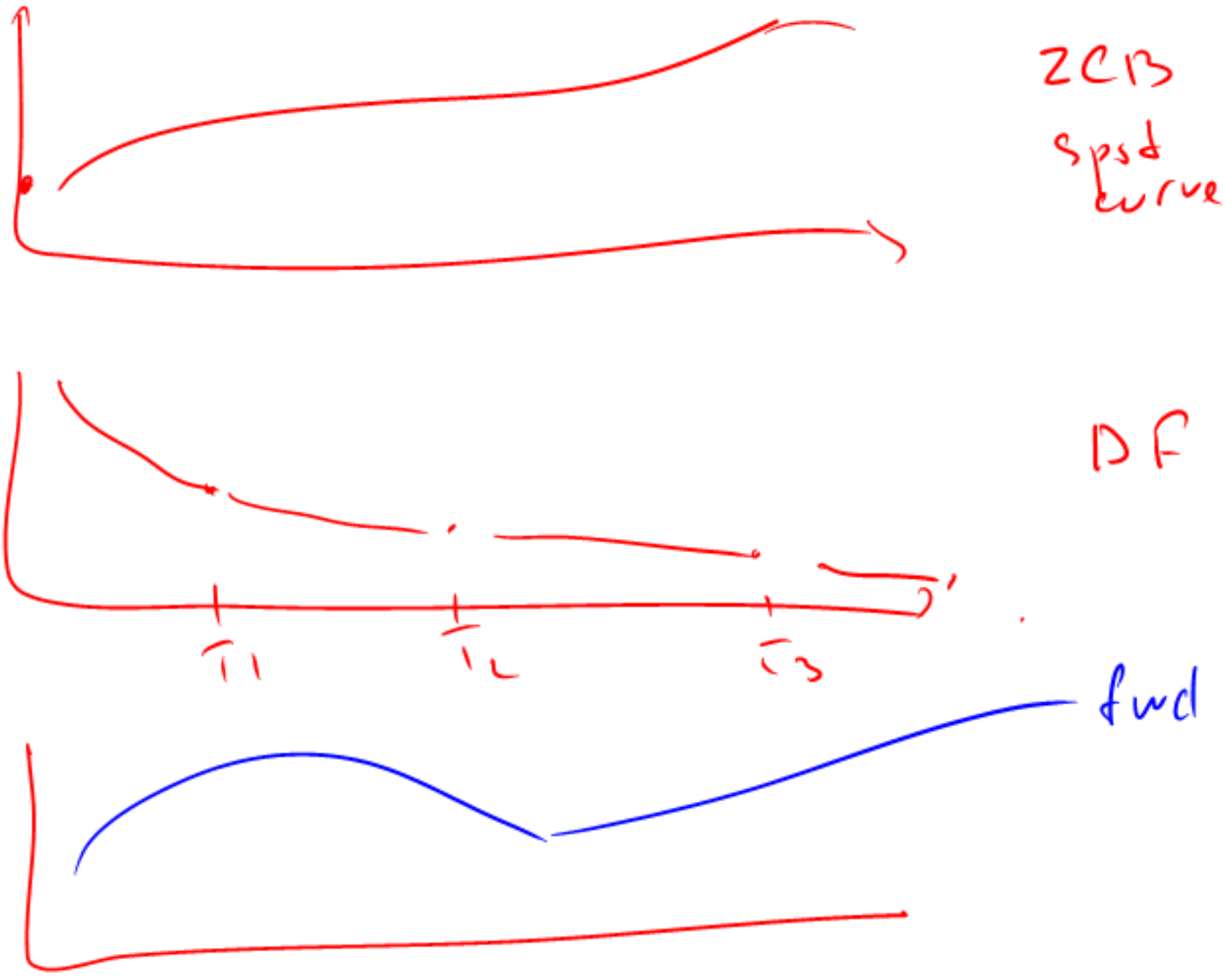


$f(t,T_1)$ — instantaneous

$F(t^*;T_1,T_2)$

↑ ↑ ↑

LMM


ZCB
spot
curve
DF
T_1
T_2
T_3
fwd

$$ISD_{fM} = \sqrt{\Lambda_1}\, e^{(1)} + \sqrt{\Lambda_2} e^{(2)} + \sqrt{\Lambda_3}\, e^{(3)}$$

$$PC5 = ax^1 + bx^2 + cx^3 + dx^4 + ex^5$$

fitting by spline — Cubic Spline

$$PC3 = az + bz^2 + cz^3$$

OLS

fitting possible by regressing on $z = 0.08, 0.5, 1, 1.5, \ldots$

Three-factor SDE

$$df = \cdots dt + \sum_{i=1}^{3} vol_i \, dX_i$$

$$\sum_{i=1}^{3} \sqrt{d_i} \, e^{(i)} \, dX_i$$

$$df_{1Y} =$$

$$df_{5Y} =$$

rule of find derivative term