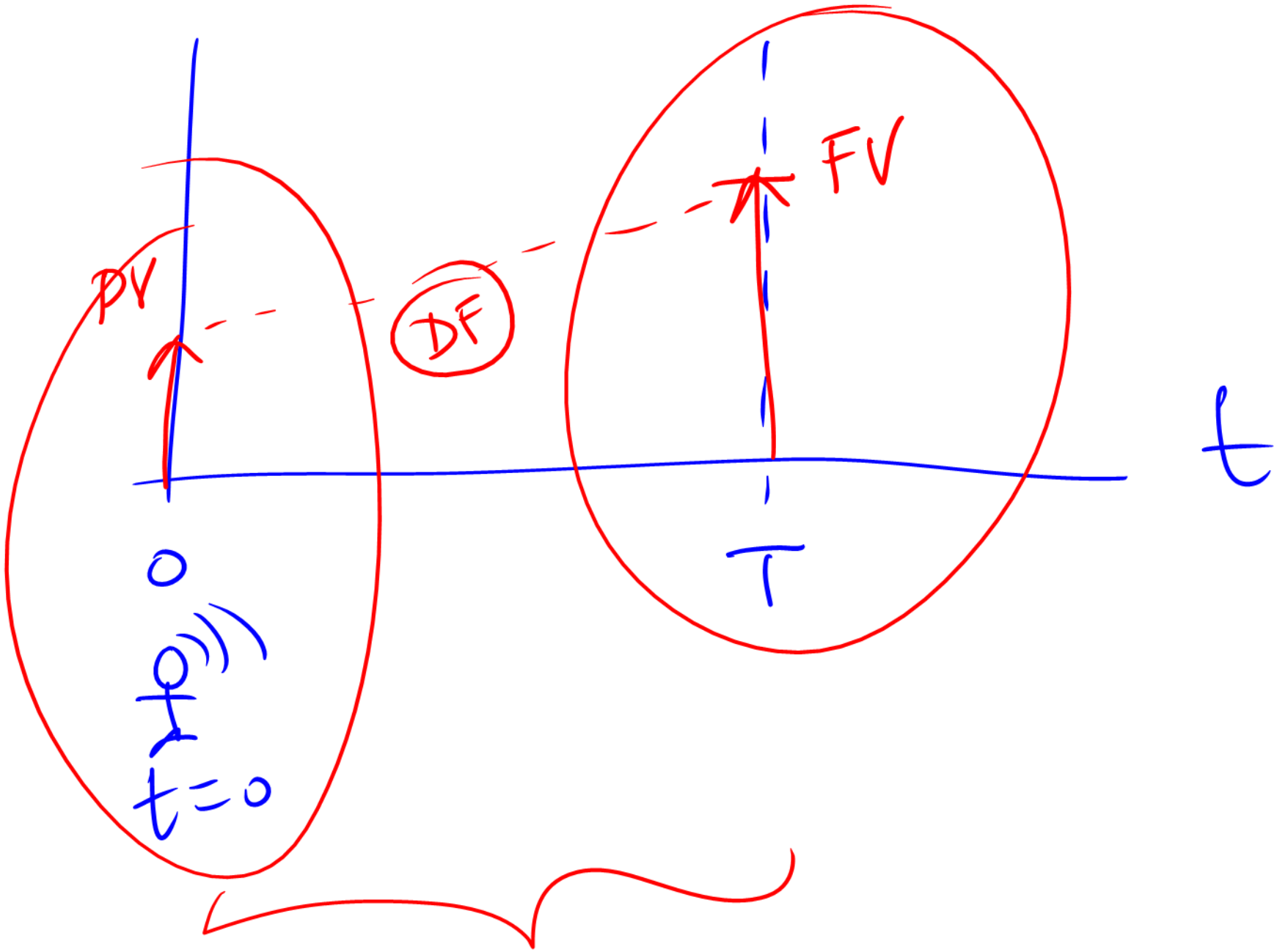
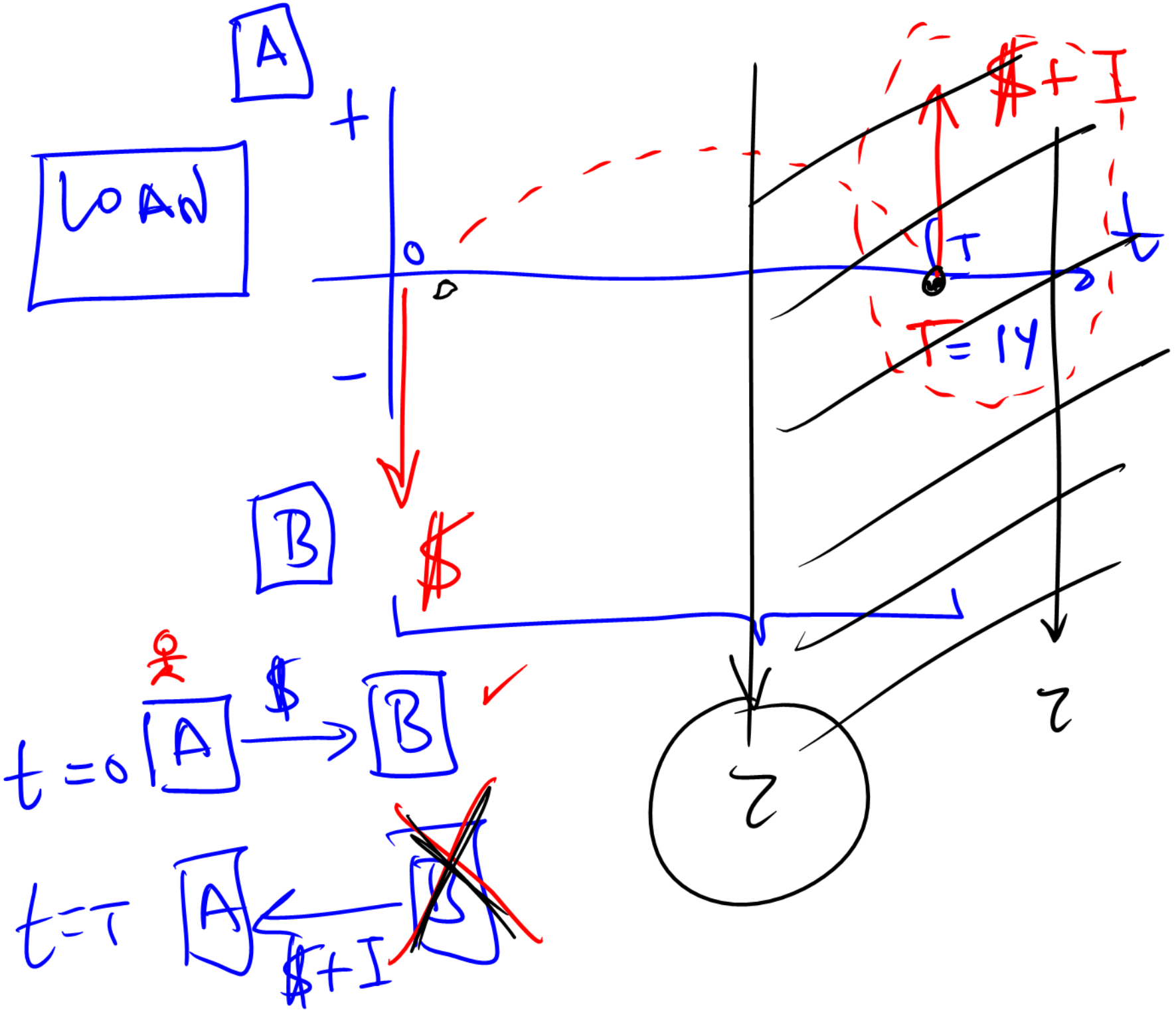
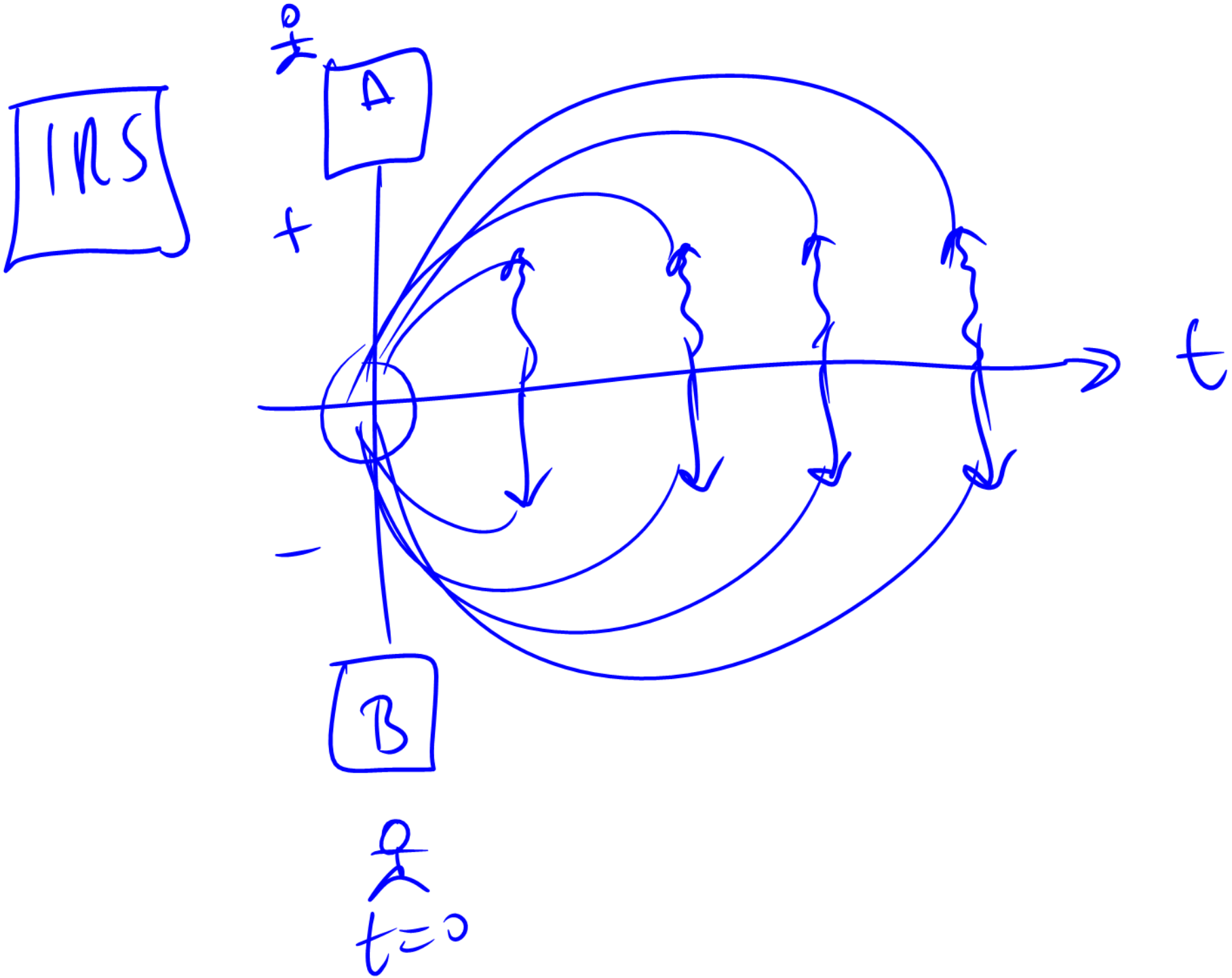
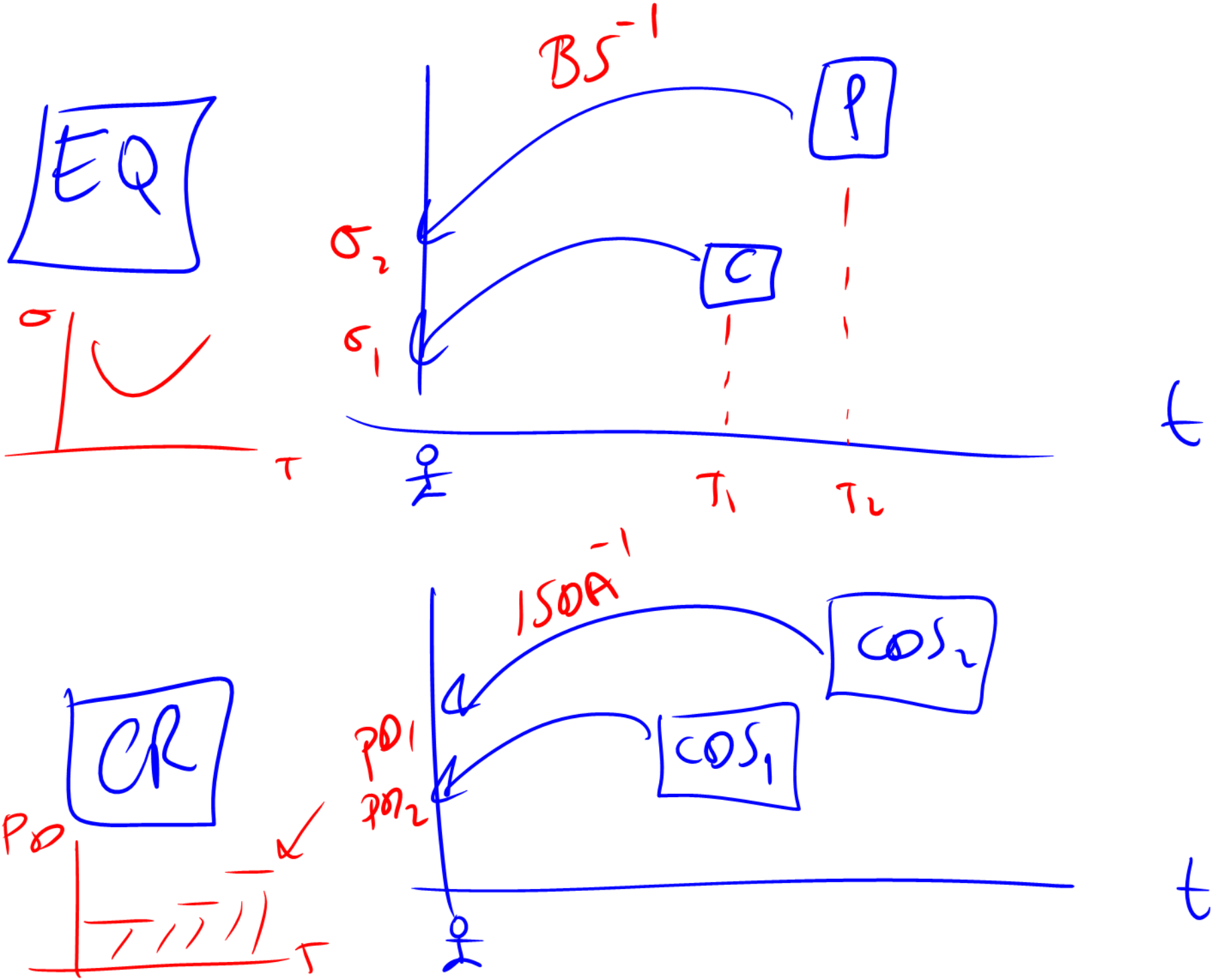
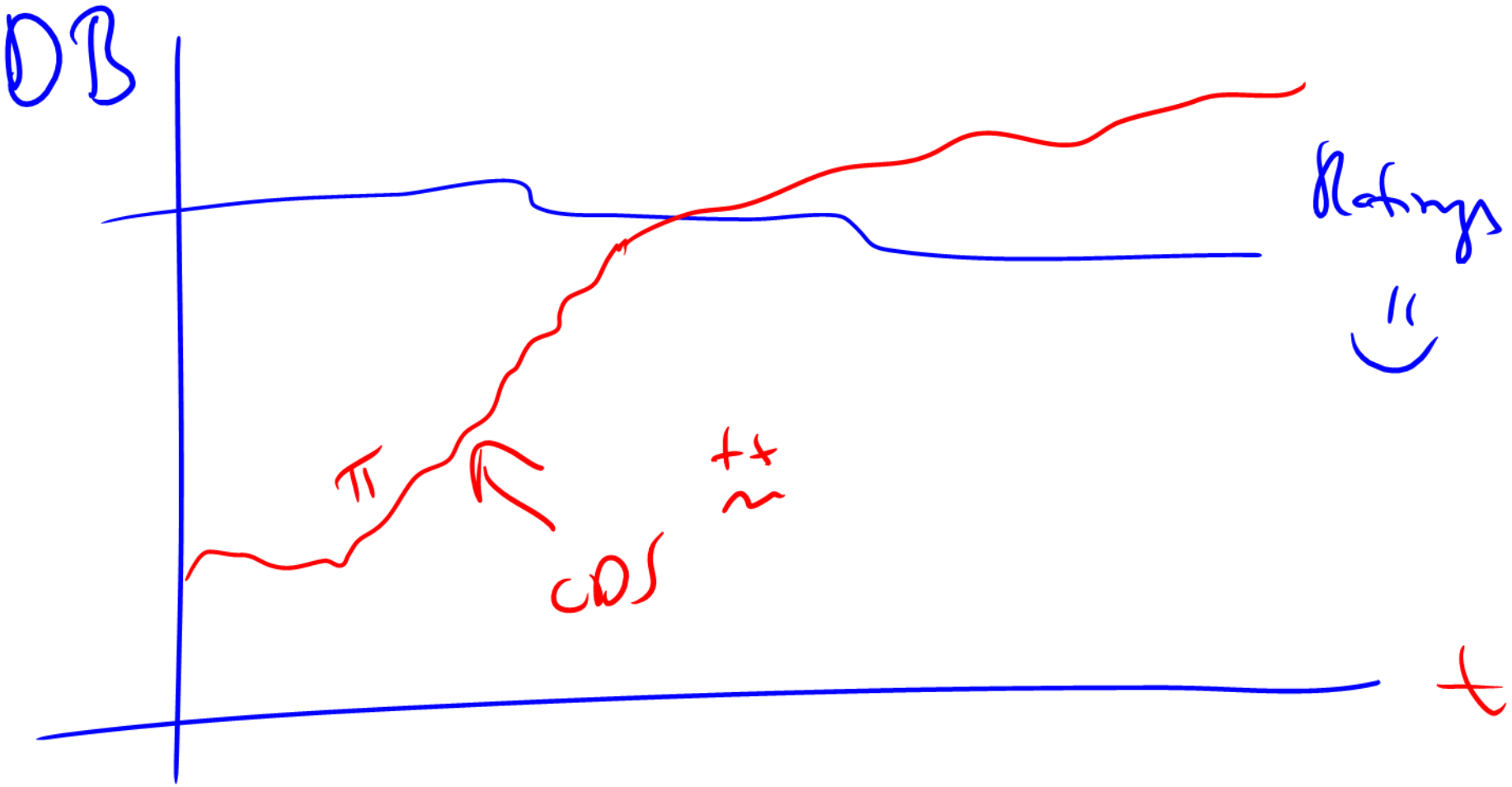
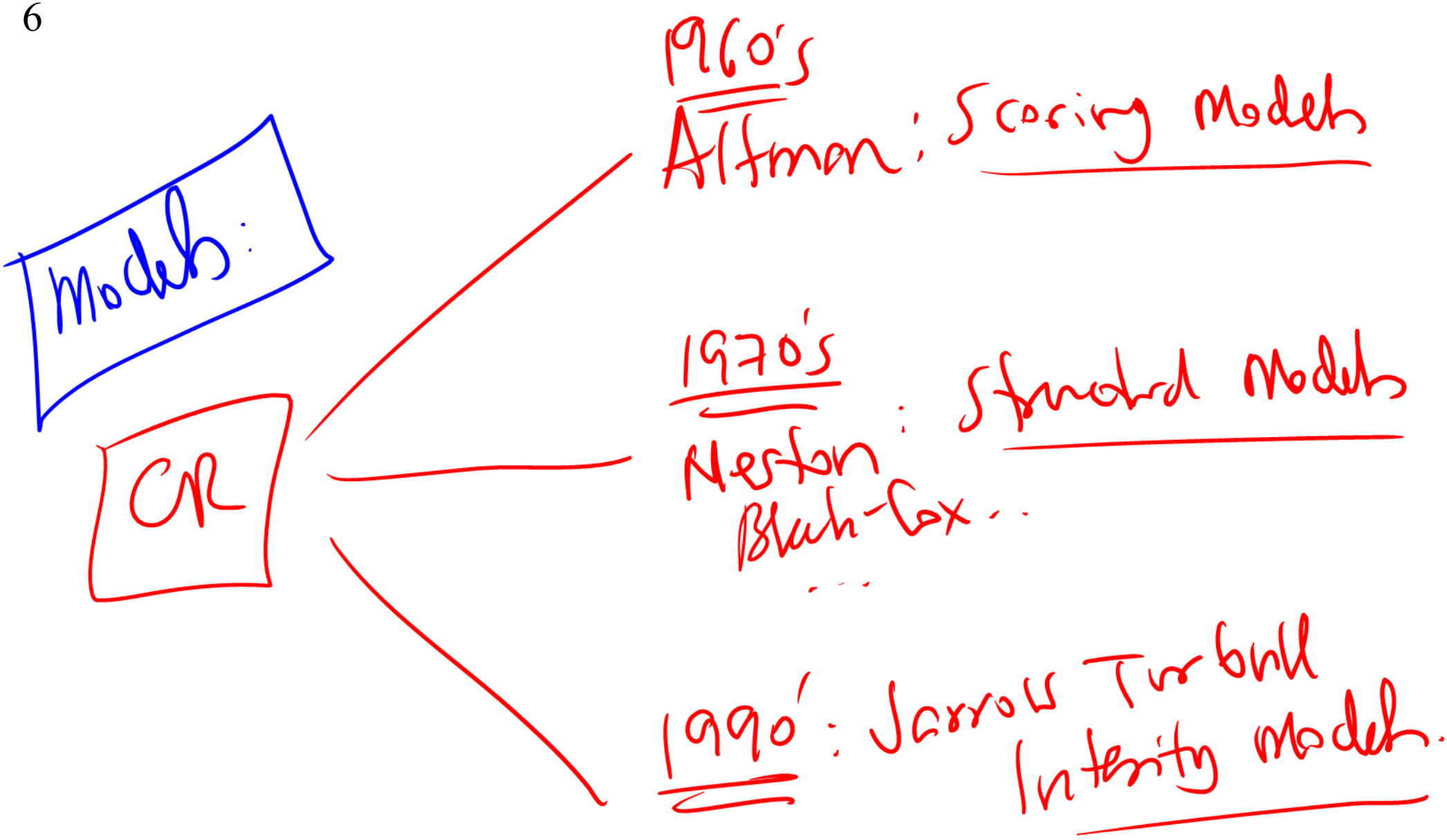

PV
DF
FV
t
0
T
t=0


A
LOAN
+
0
D
−
B
$
$+I
T
t
T = 14
t=0
A
$
B
t=T
A
$+I
B
2
2

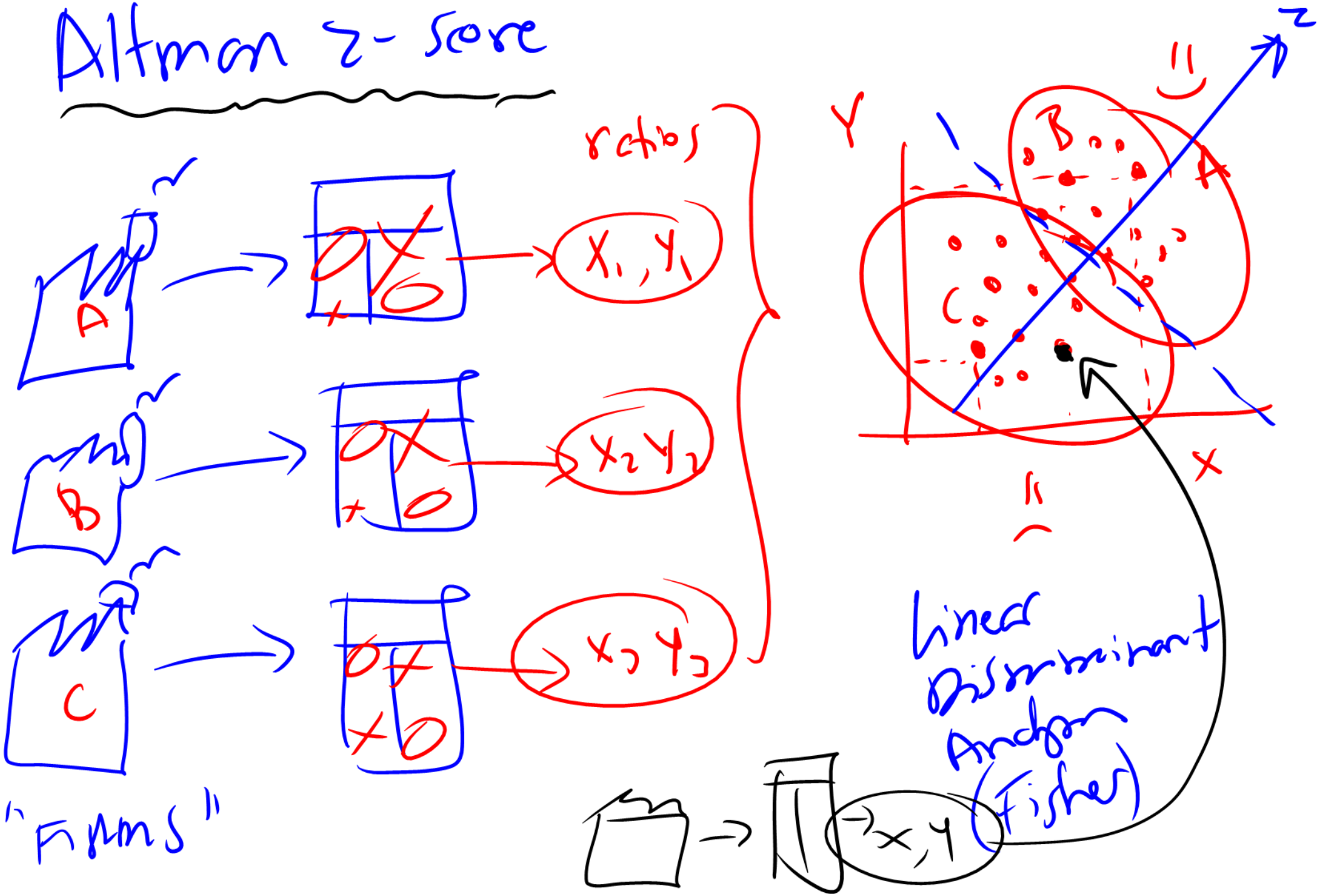

IRS
A
+
−
B
t
t=0


EQ
σ
τ
BS⁻¹
P
C
σ₂
σ₁
t
T₁
T₂
CR
P0
150A⁻¹
cos₂
cos₁
pol
pol₂
t


DB
Ratings
π
cos
++
t

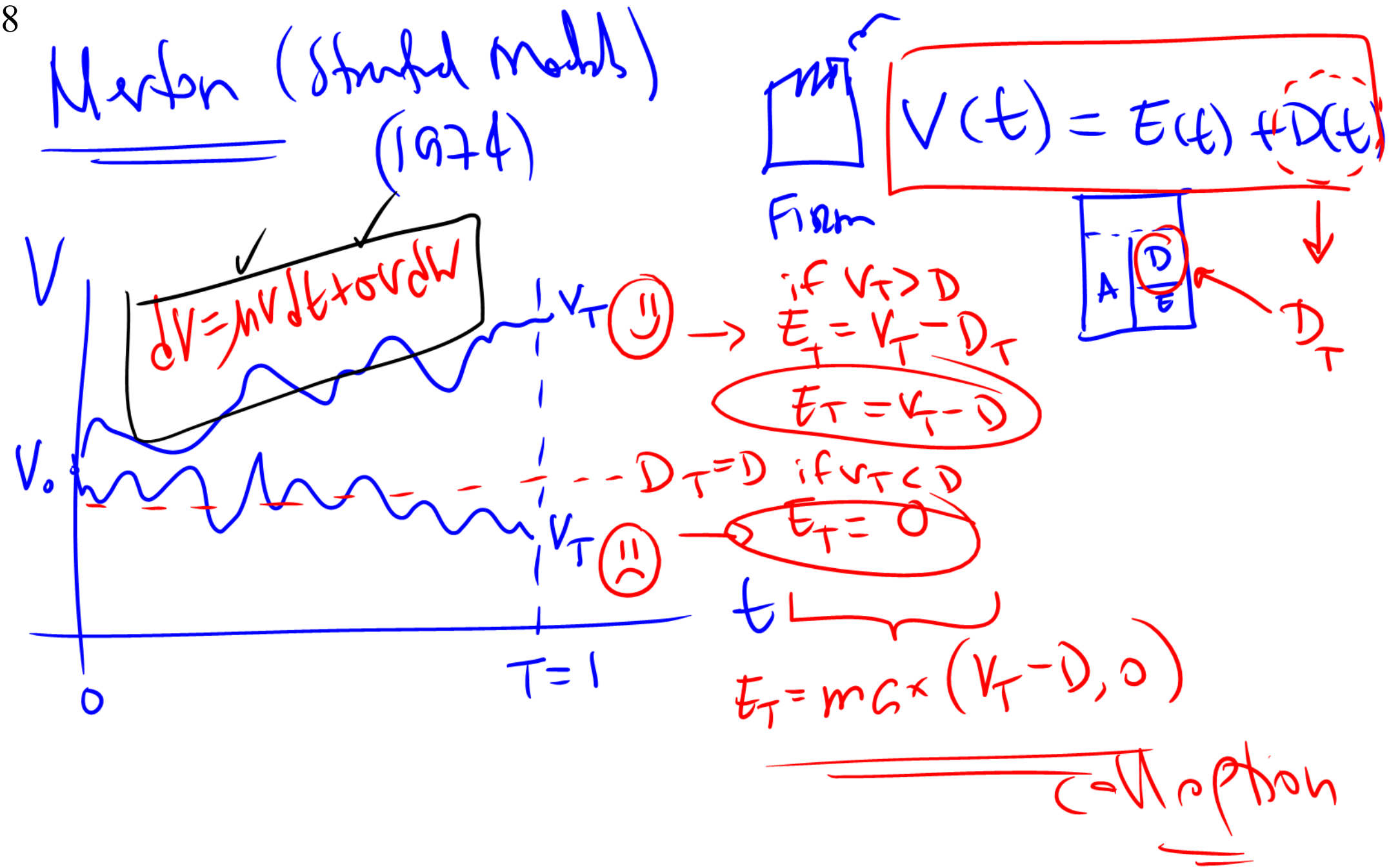

Models:
CR
1960's
Altman: Scoring Models
1970's
Merton
Black-Cox...
1990': Jarrow Turnbull
Intensity Models.

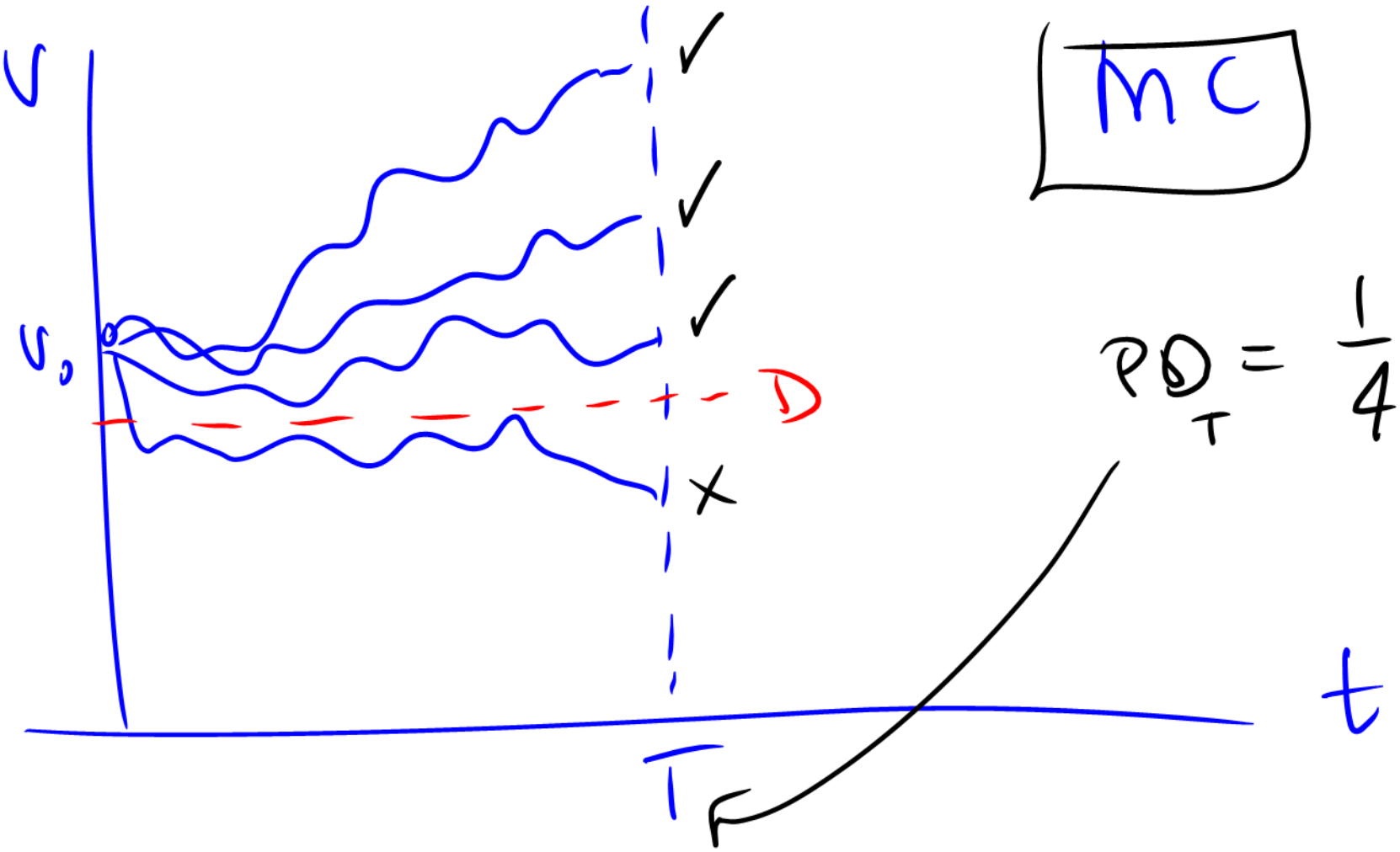
Altman z-score



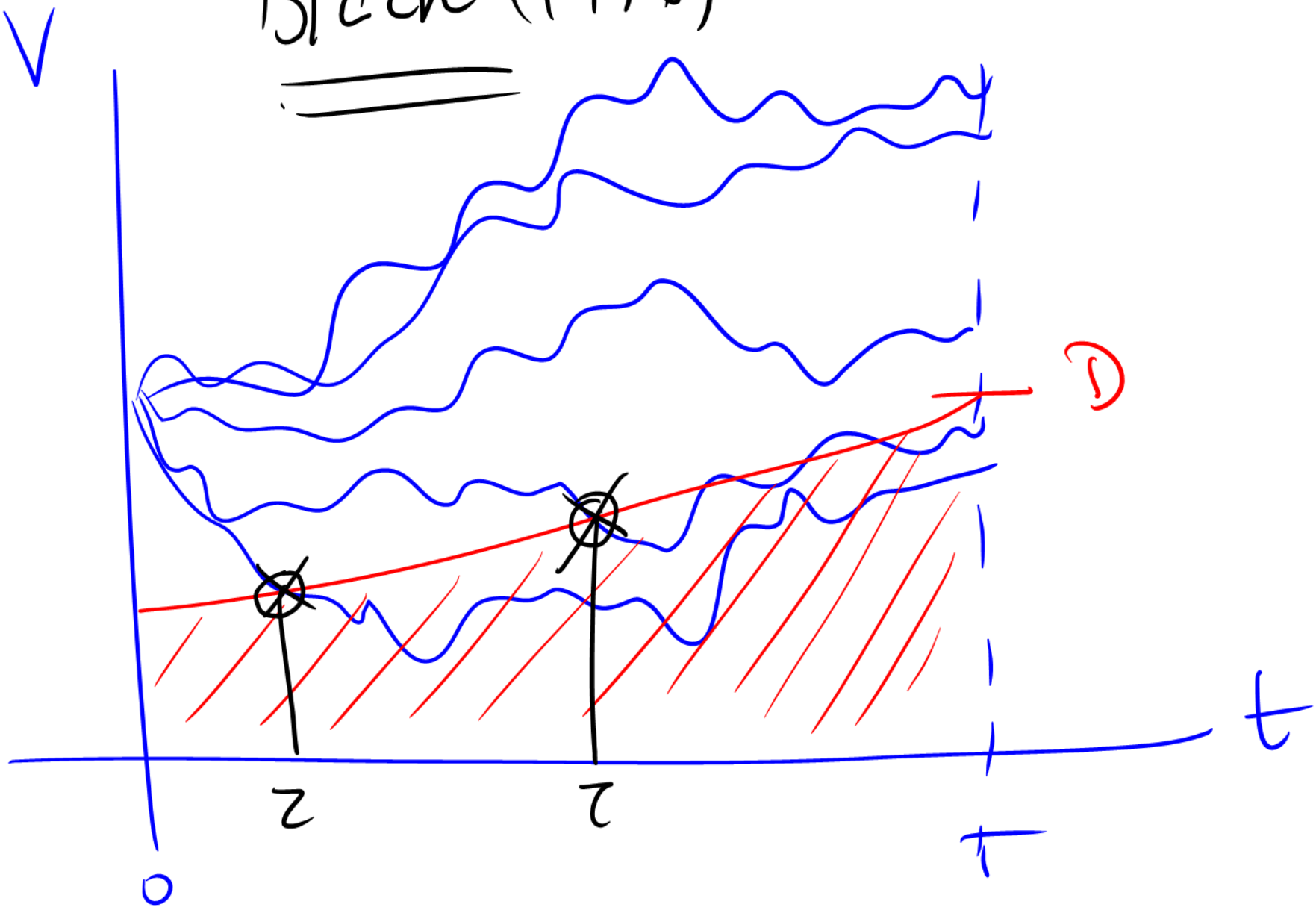
Merton (Structural Models)

(1974)




V
V_0
D
T
t
MC
$PD_T = \frac{1}{4}$

Black (1976)



Intensity Models

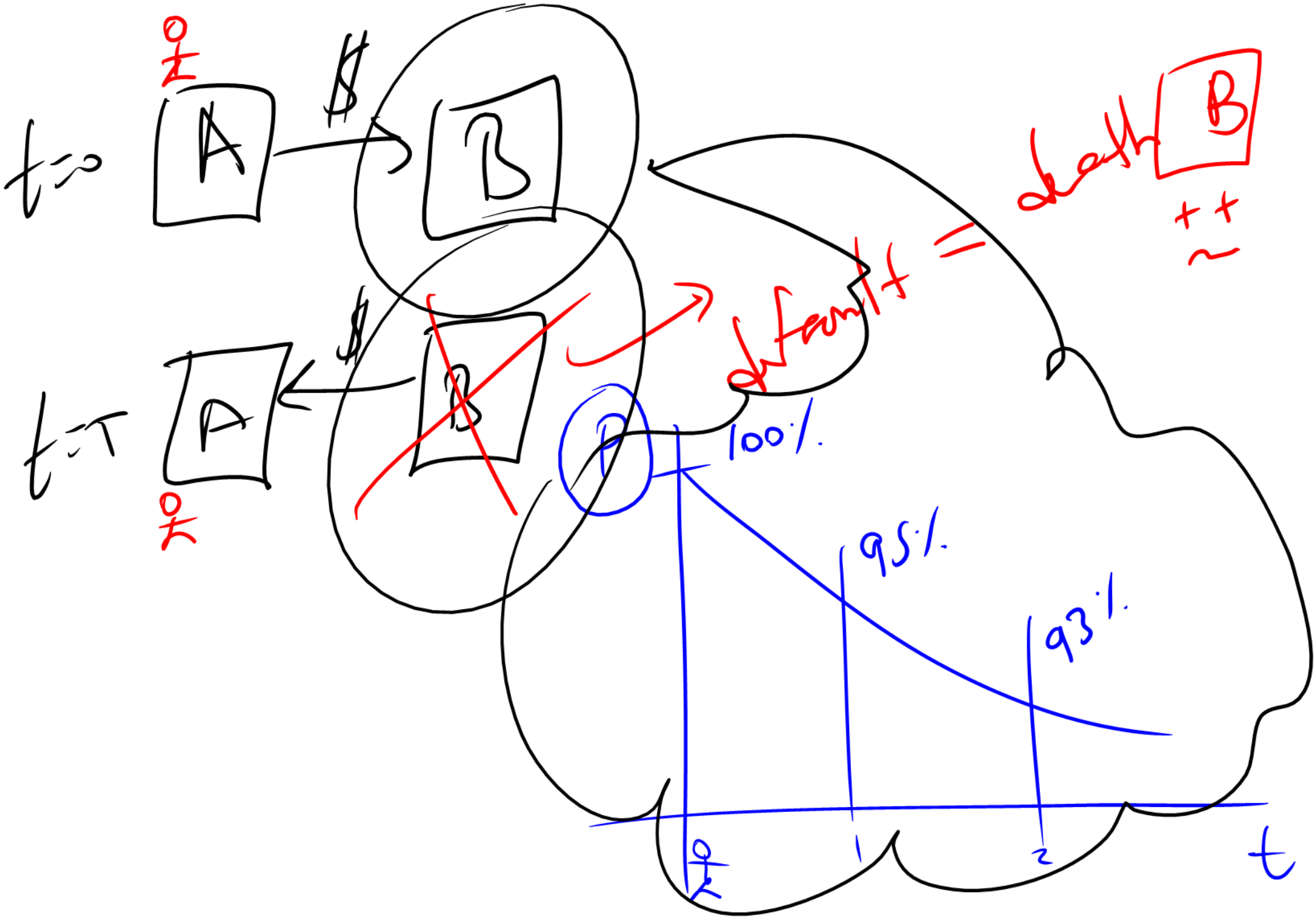
default ↔ prob. event

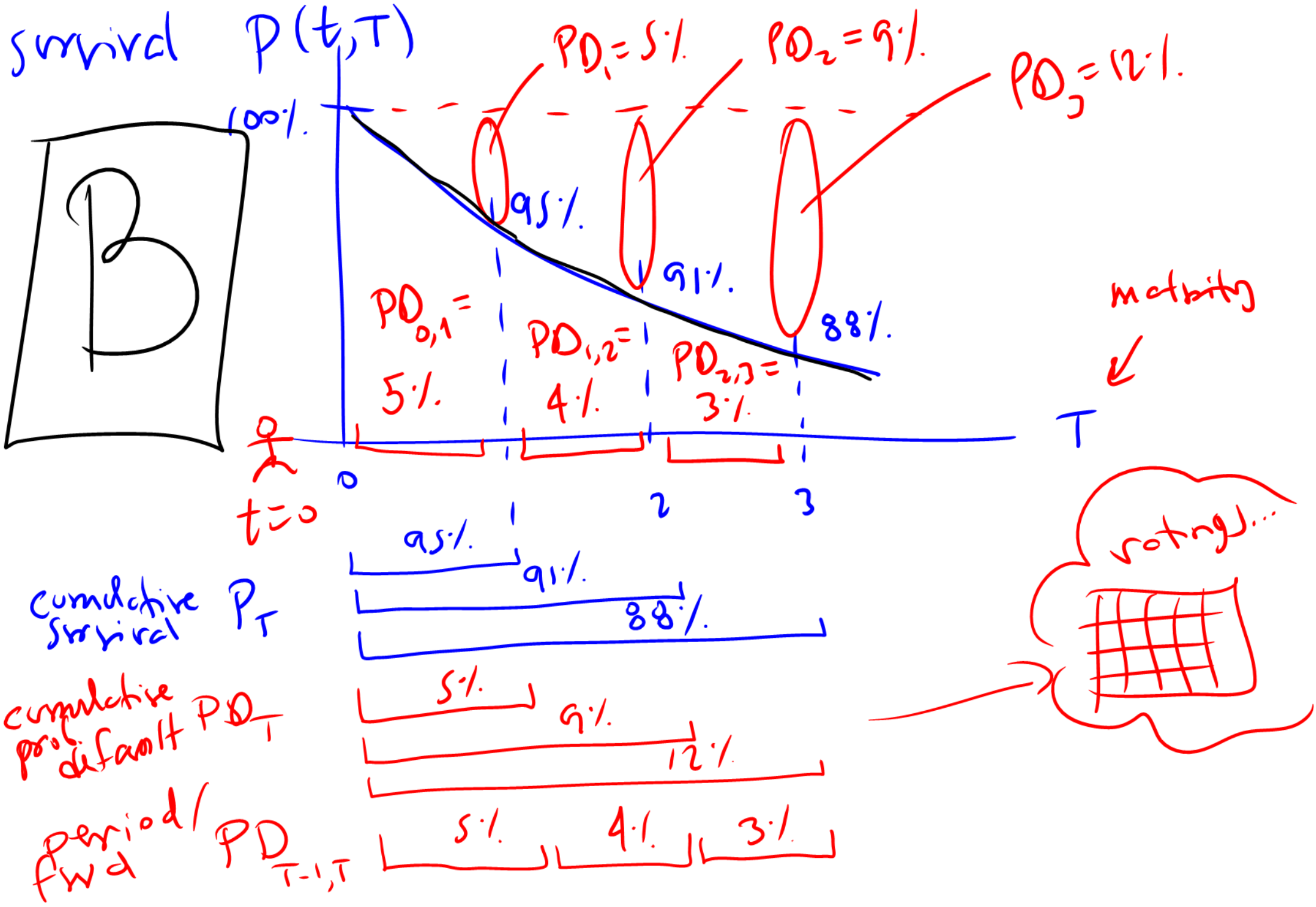
Survival probability

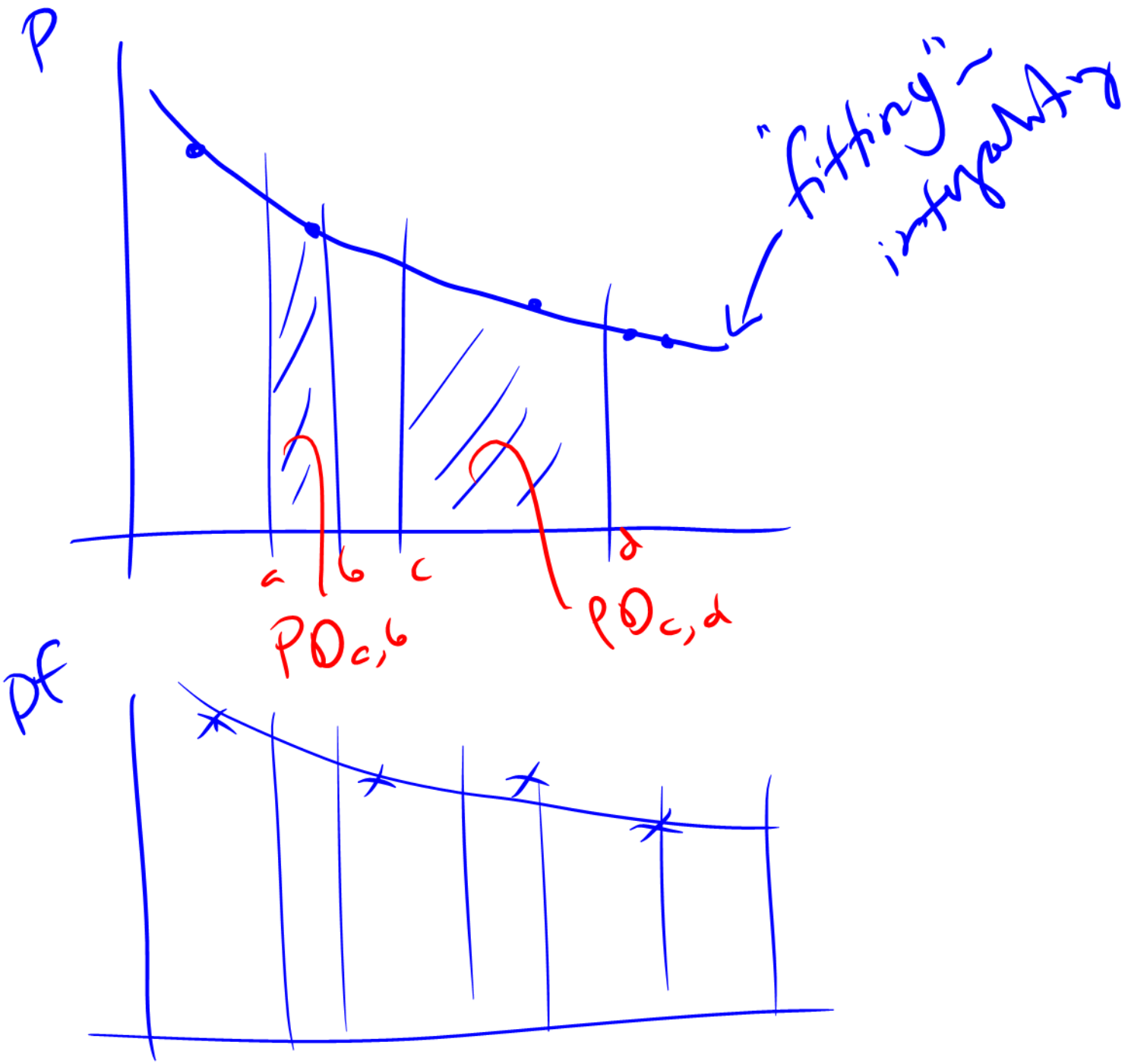
B

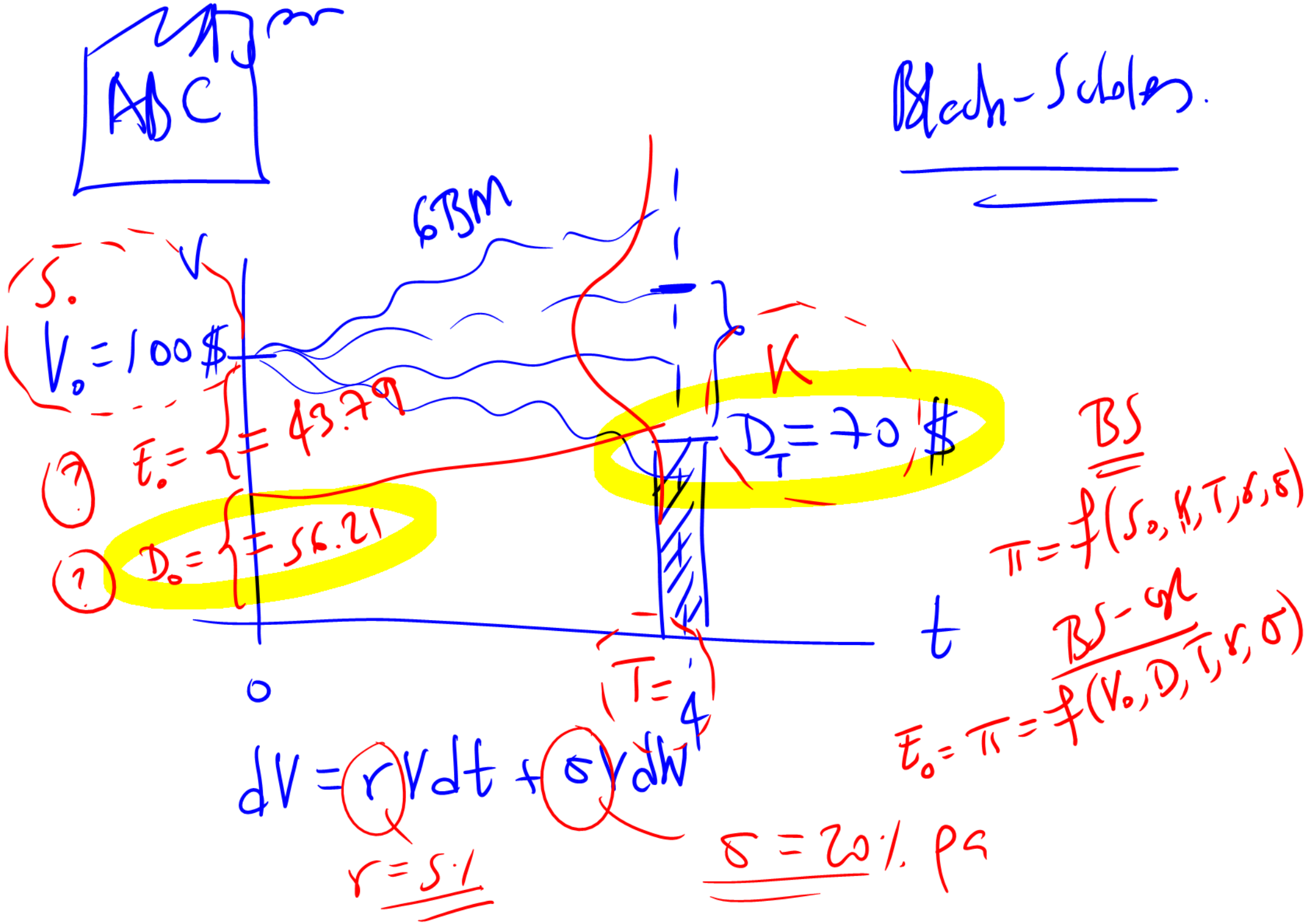
100%

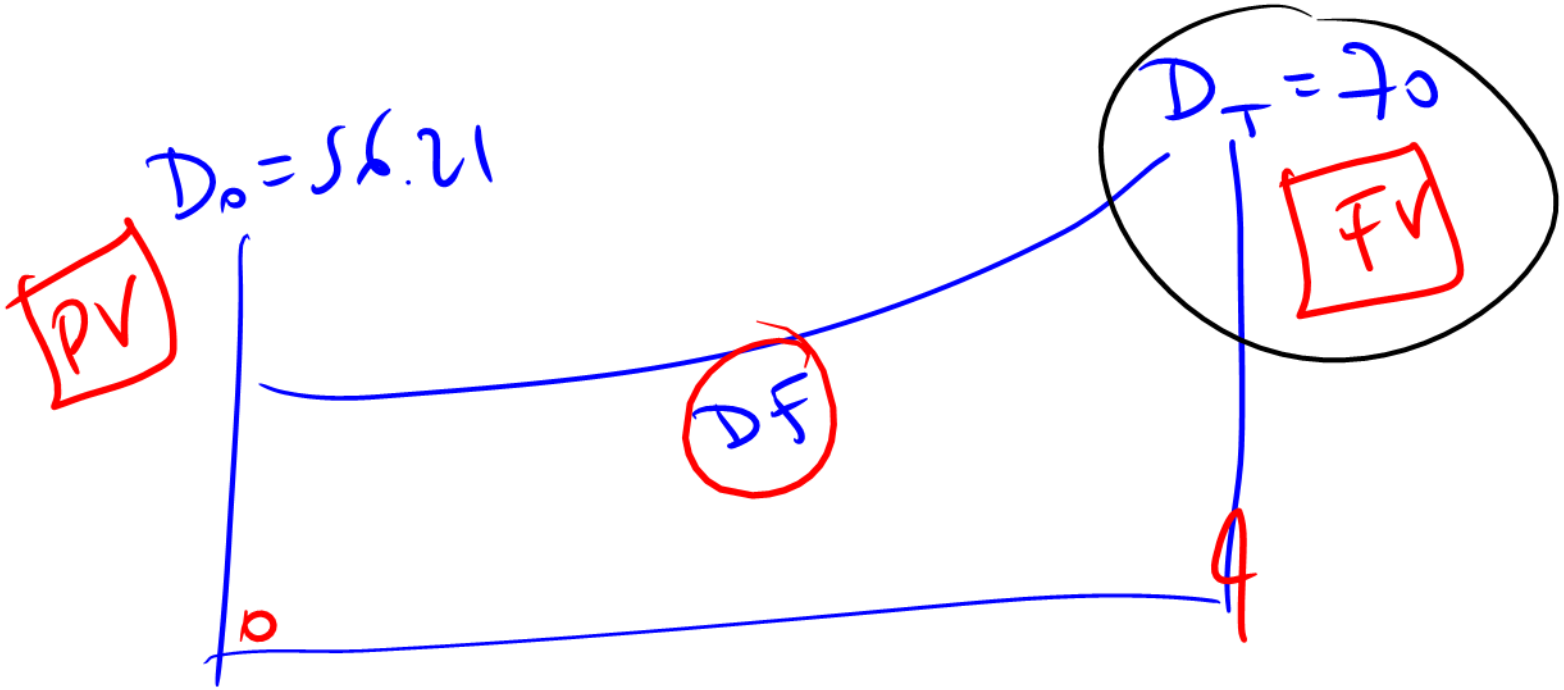
t


A
B
A
B
100%
95%
93%
t
1
2


survival P(t,T)
100%
PD1 = 5%
PD2 = 9%
PD3 = 12%
95%
91%
88%
PD0,1 = 5%
PD1,2 = 4%
PD2,3 = 3%
maturity
T
t=0
0
1
2
3
95%
91%
88%
cumulative survival PT
5%
9%
12%
cumulative prob. default PDT
period/ fwd PDT-1,T
5%
4%
3%
rating...


P
"fitting" ~ integrating
a
b
c
d
PDc,b
PDc,d
Pf


ABC
Black-Scholes
GBM
V
S.
$V_0 = 100\$$
$E_0 =$ } $= 43.79$
$D_0 =$ } $= 56.21$
K
$D_T = 70\$$
t
0
$T = 1/4$
$dV = rV dt + \sigma V dW$
$r = 5.1$
$\sigma = 20\%$ pa
BS
$\pi = f(S_0, K, T, r, \sigma)$
BS - ok
$E_0 = \pi = f(V_0, D, T, r, \sigma)$



$$PV = Df \times FV$$

$$PV = \exp(-yT) \times FV$$

$$56.21 = \exp(-y \cdot 4) \times 70$$

$\hookrightarrow y = 5.49$

if $r = 5\%$ risk free

then spread $\therefore$ credit $\underline{0.49}$ bps