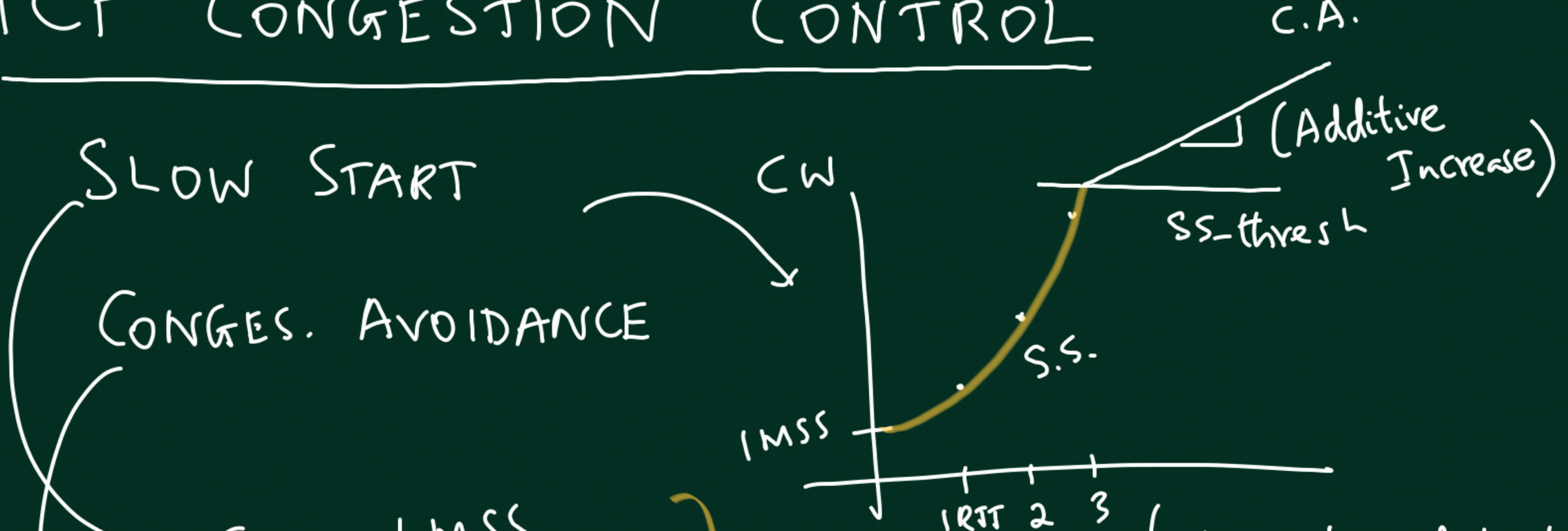
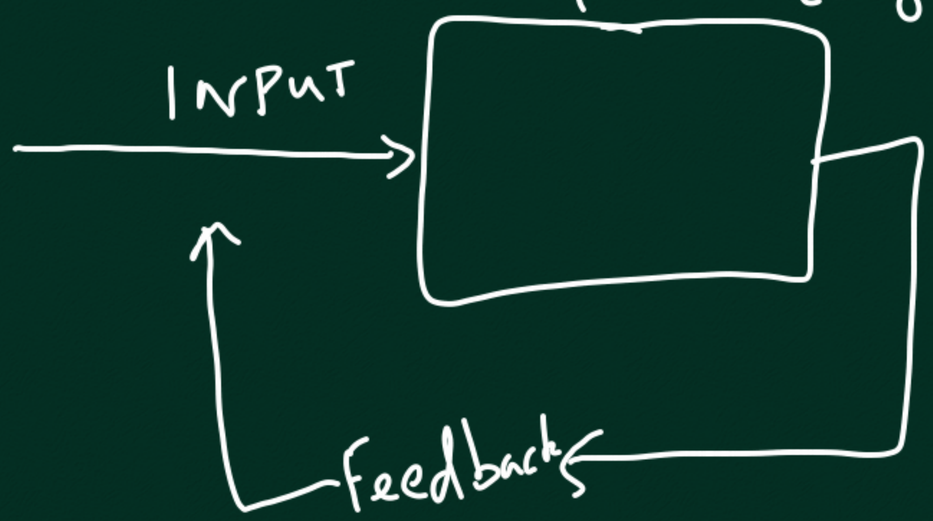
TCP Congestion Control



How to detect & react to Congestion?

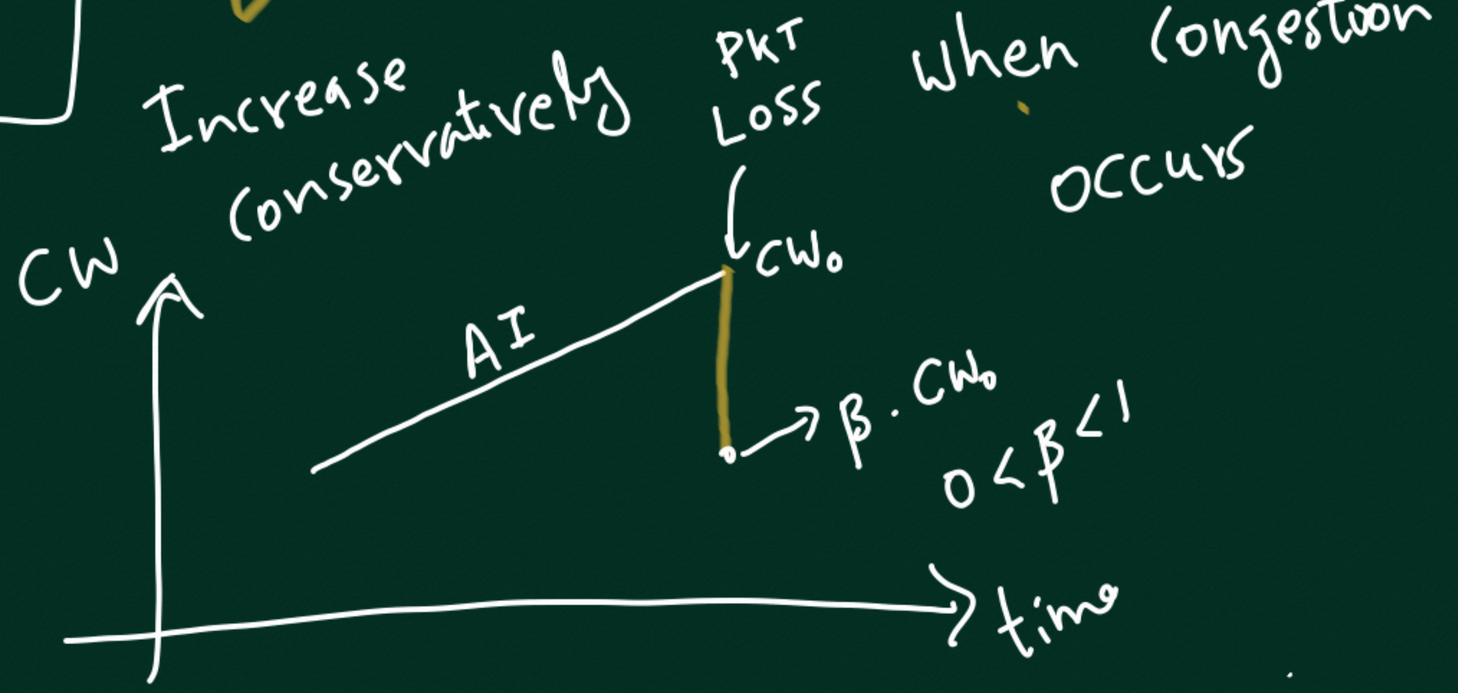
STABILITY → No prolonged congestion



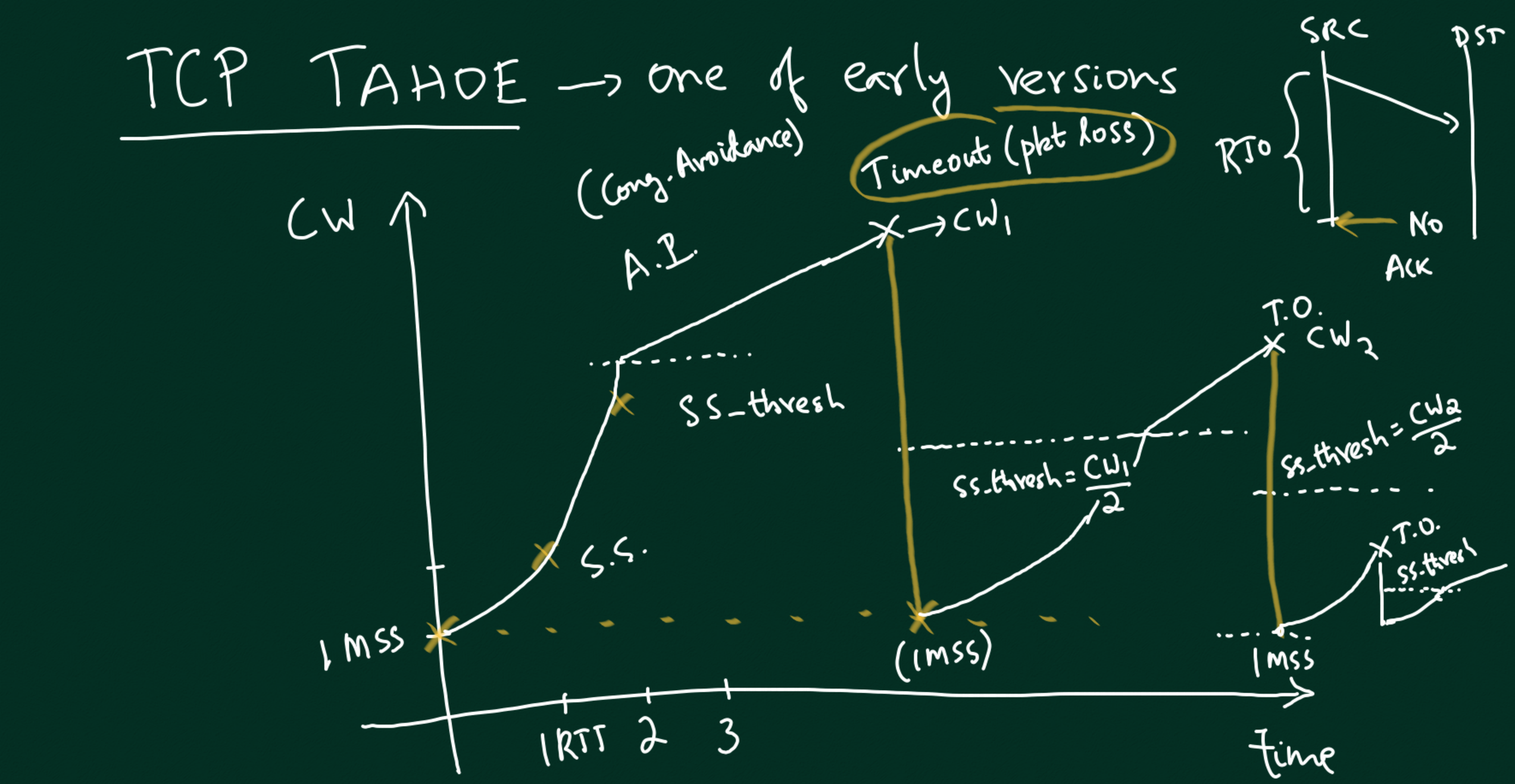
AI-MD: Additive Increase Multiplicative Decrease

Increase Conservatively

Drastic decrease When congestion occurs

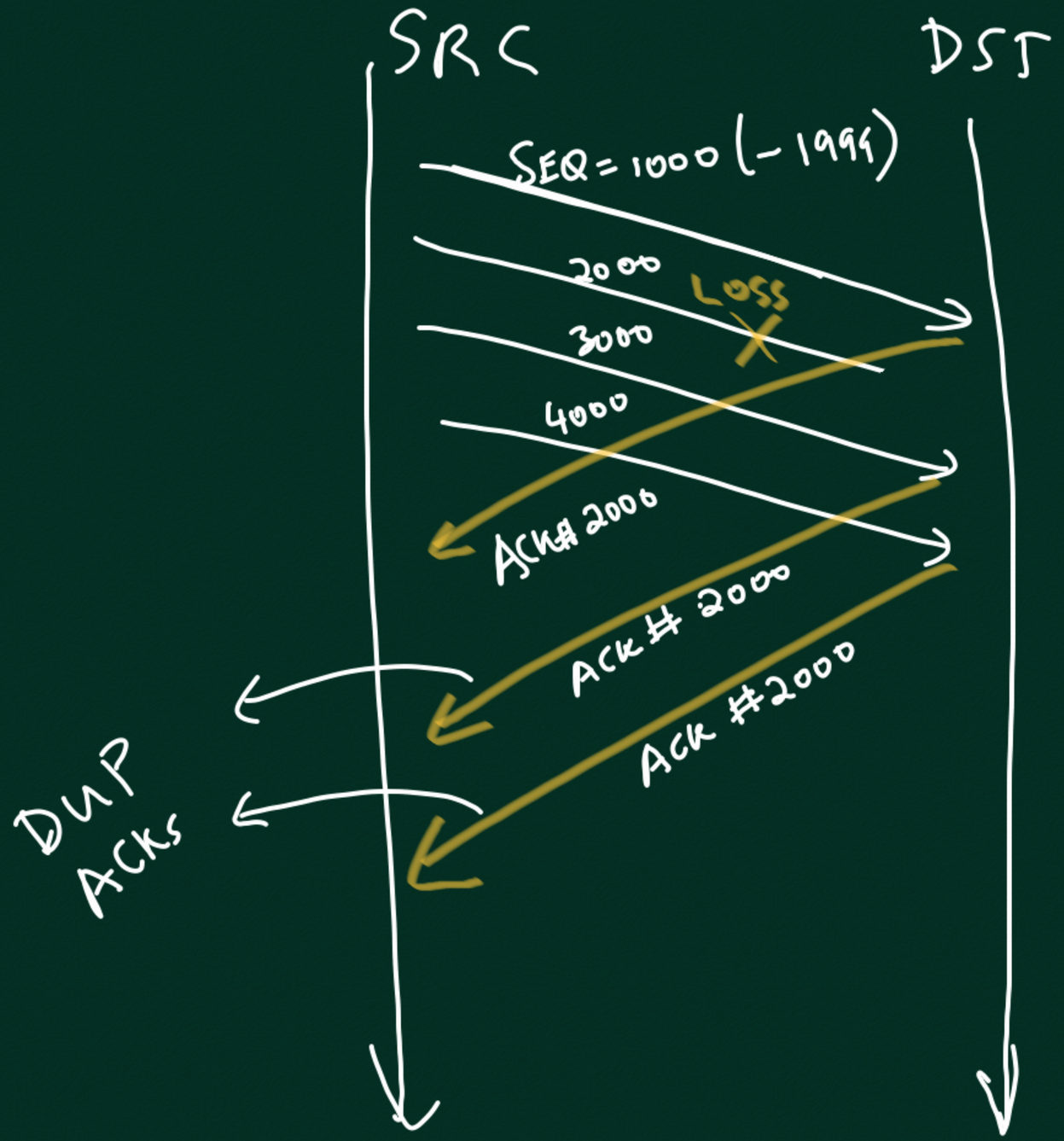


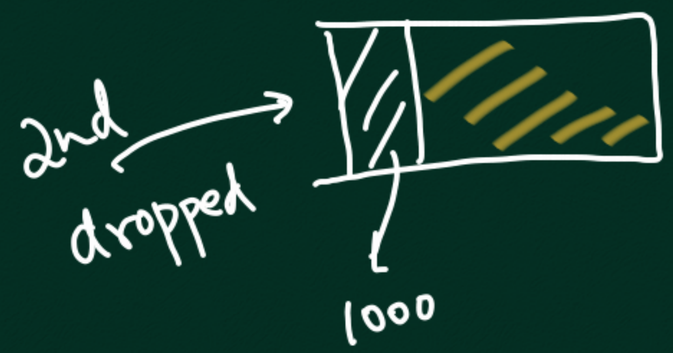
TCP TAHOE → one of early versions

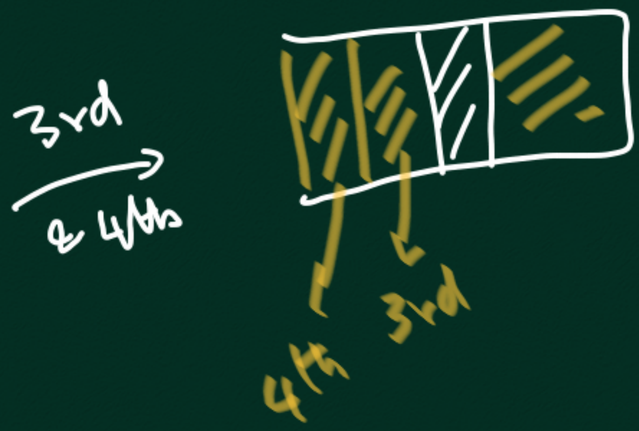


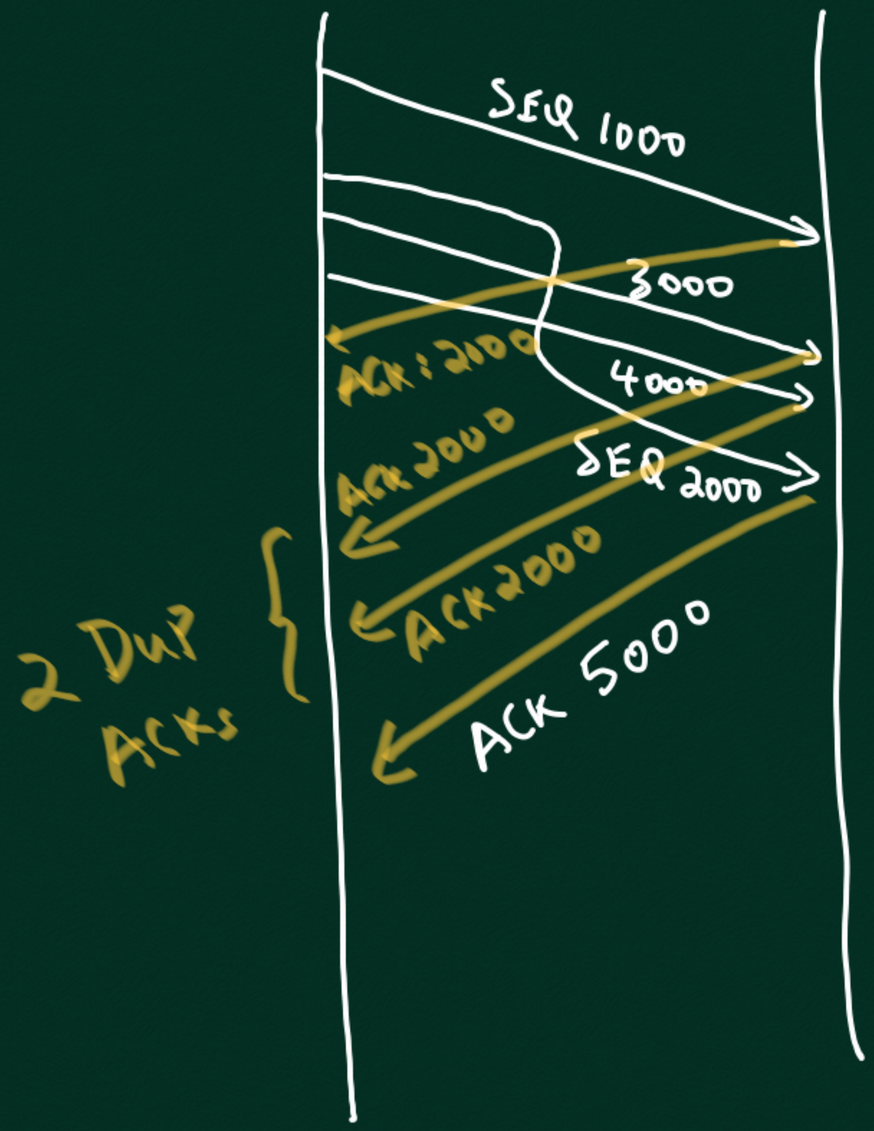
TCP Reno

Q. Can we detect Loss before time-out?


SRC
DST
SEQ=1000 (-1999)
2000
LOSS
3000
4000
ACK# 2000
ACK #2000
ACK #2000
DUP ACKs


2nd dropped
1000

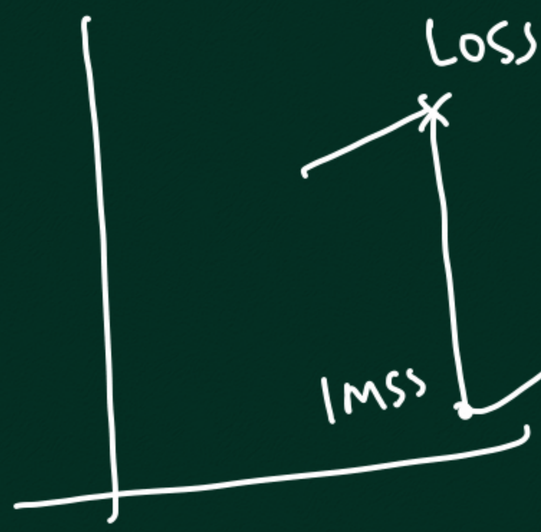

3rd
& 4th
4th
3rd



RULE: ON Getting

3 DUP ACKs, assume packet is lost

Should we reduce Cw to 1MSS for every Loss?



T.O. Loss → Very drastic congestion
(No Dup ACKs ⇒ pkts not getting through)

T.D. → Not very drastic Congestion

→ Triple Dup ACKs

TCP Reno

Fast Retransmit: g_f 3 Dup Acks received

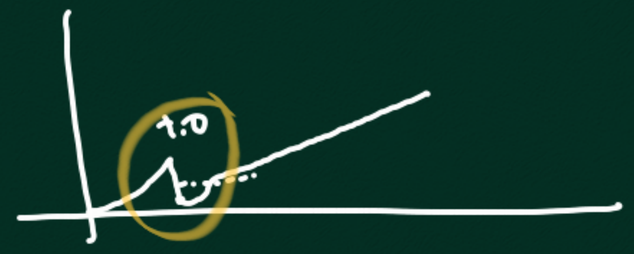
$\longrightarrow$ assume segment lost & retransmit it

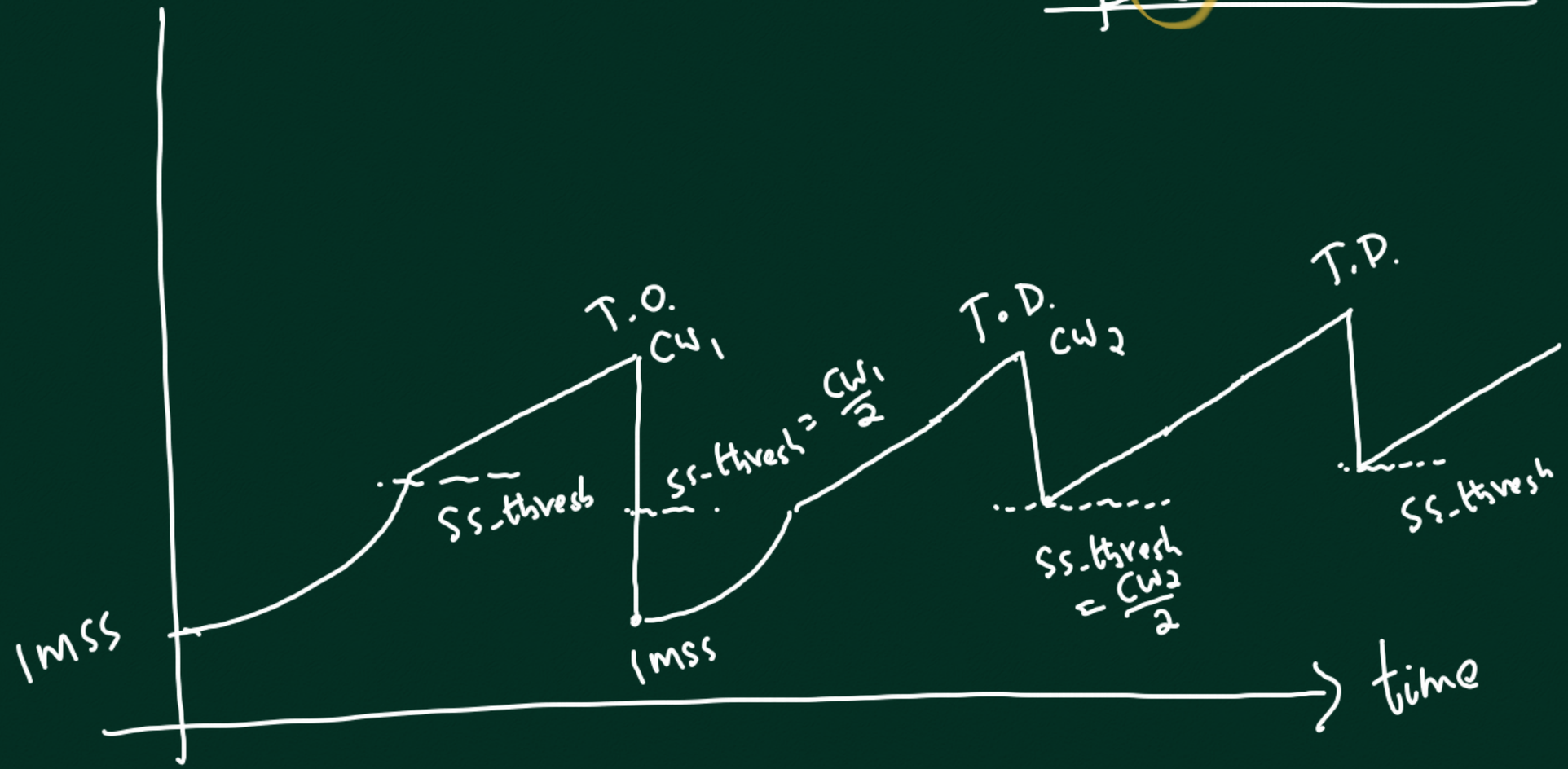
Fast Recovery: On getting 3 Dup Acks,

$$ss\_thresh = \frac{CW}{2}$$

$$CW = \frac{1}{2} \times CW$$

TCP RENO


T.O.


T.O.
CW_1
$Ssthresh = \frac{CW_1}{2}$
T.D.
CW_2
T.D.
$Ssthresh = \frac{CW_2}{2}$
1MSS
1MSS
time

TCP VEGAS

MZWGNSFR