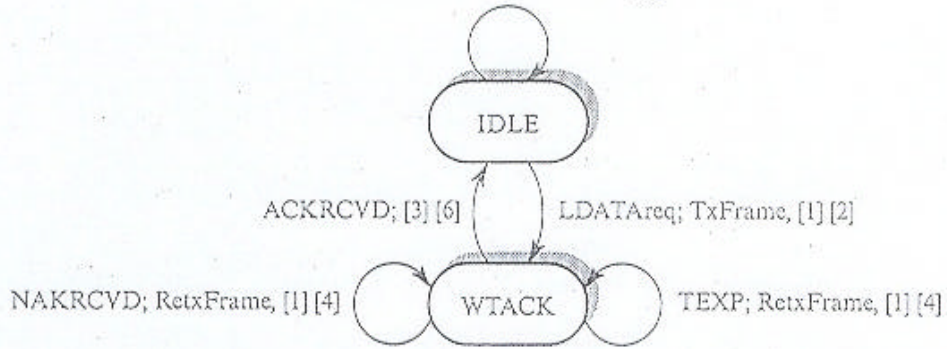


(a)

ACKRCVD/NAKRCVD; [5]



(b)

Present state \ Incoming event	LDataReq	ACKRCVD	TEXP	NAKRCVD
	IDLE	1	0	0
WTACK	0	2	3	3

0 = [5], IDLE (Error condition)

1 = TxFrame, [1] [2], WTACK

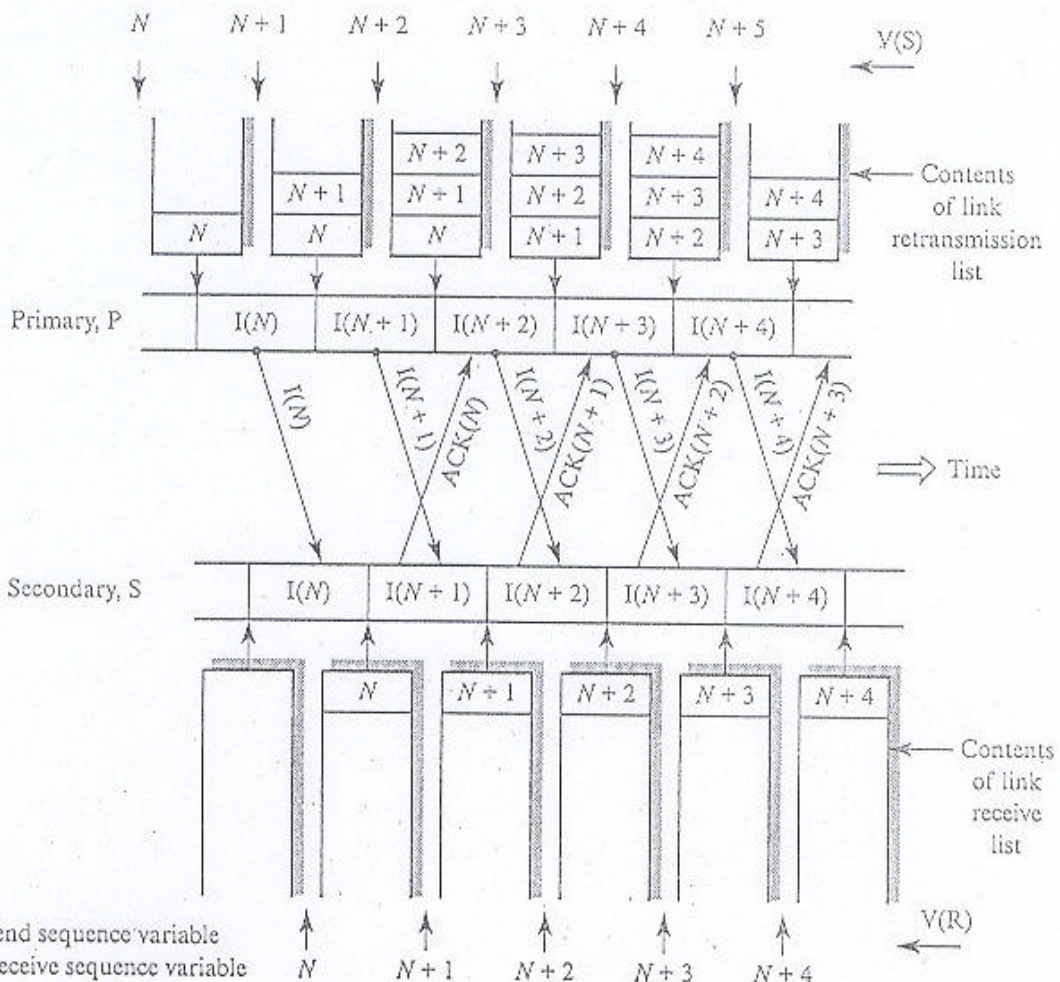
2 = P0 and P1: [3] [6], IDLE

P0 and NOT P1: RetxFrame, [1] [4], WTACK

NOT P0 and NOT P1: [5], IDLE

3 = RetxFrame, [1] [4], WTACK

Continuous RQ
3 | No errors

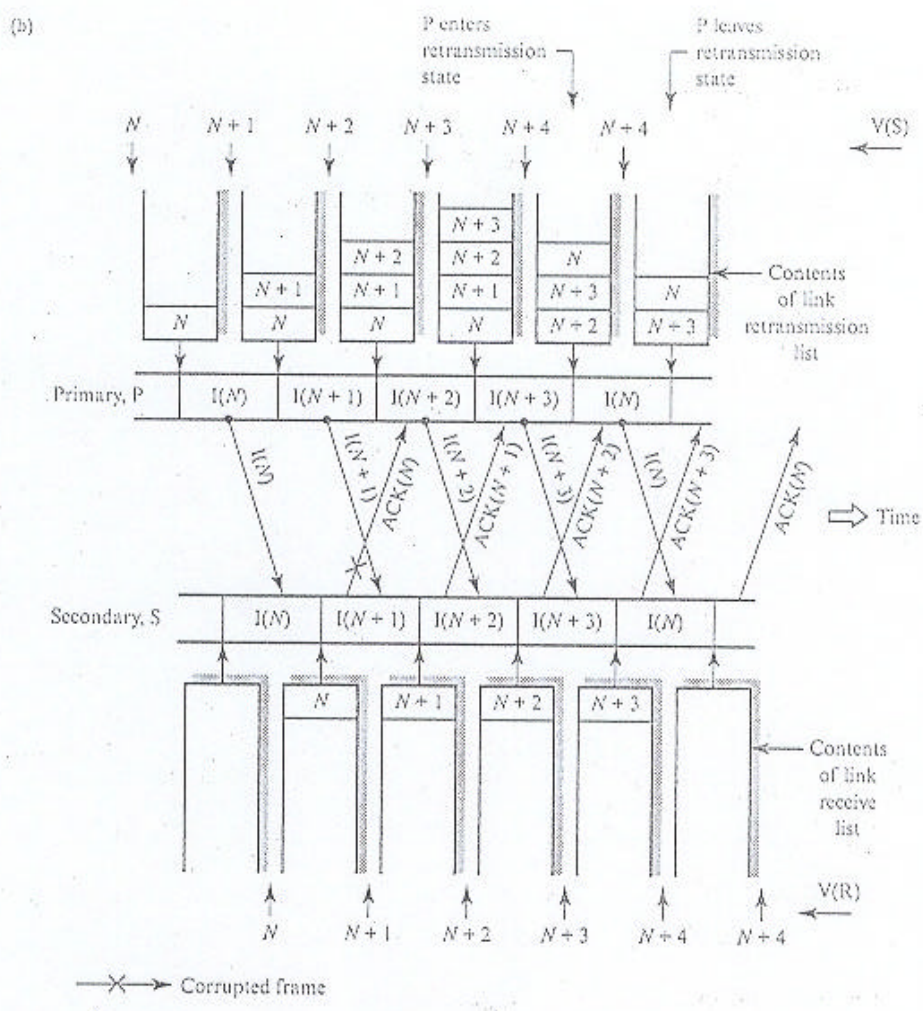


V(S) = Send sequence variable

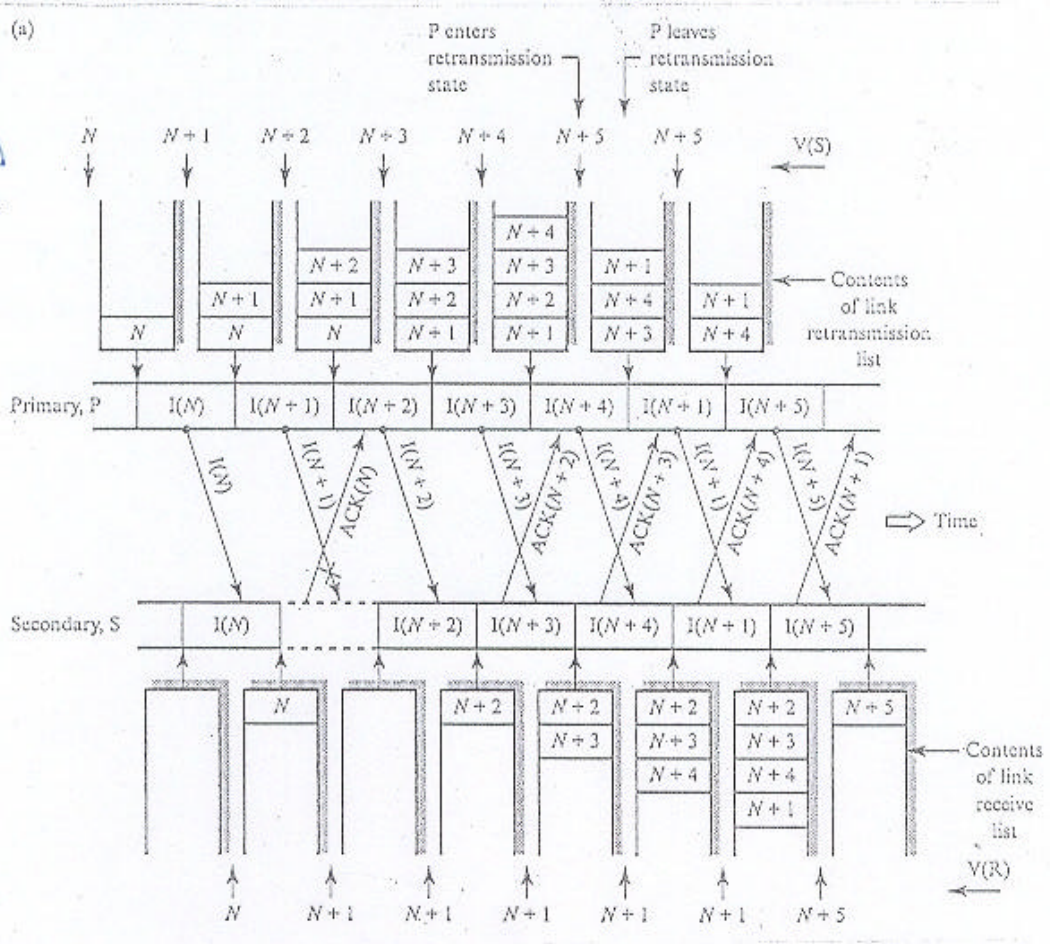
V(R) = Receive sequence variable

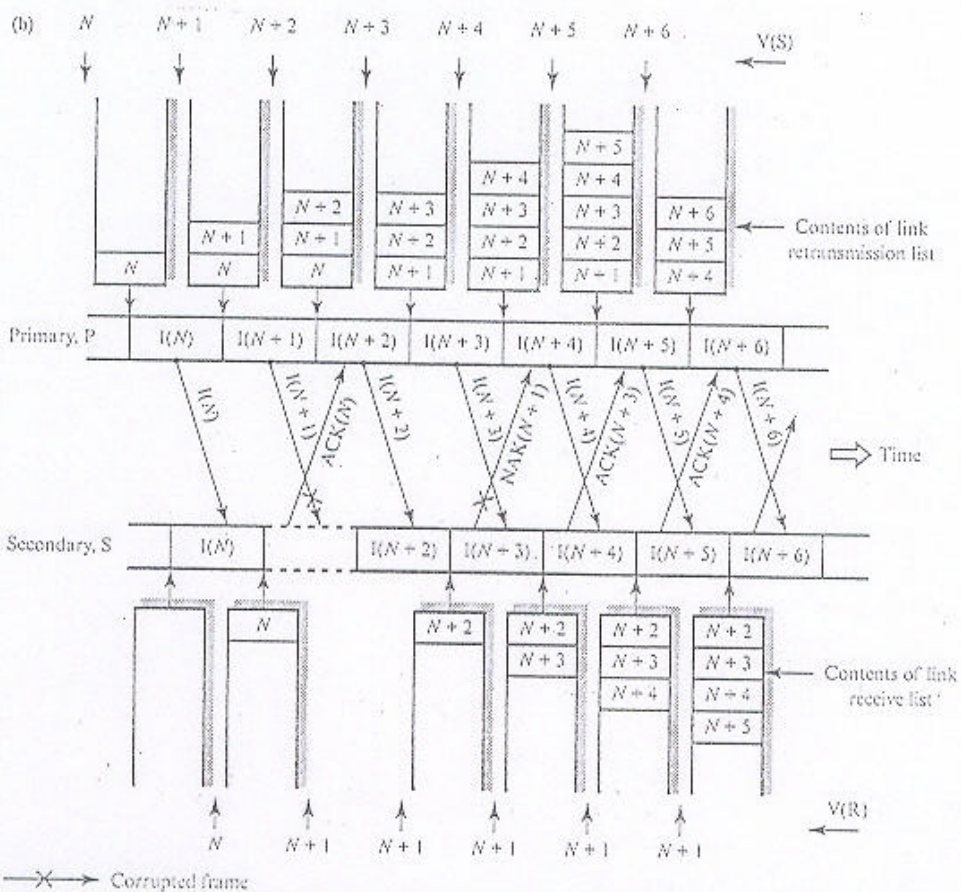
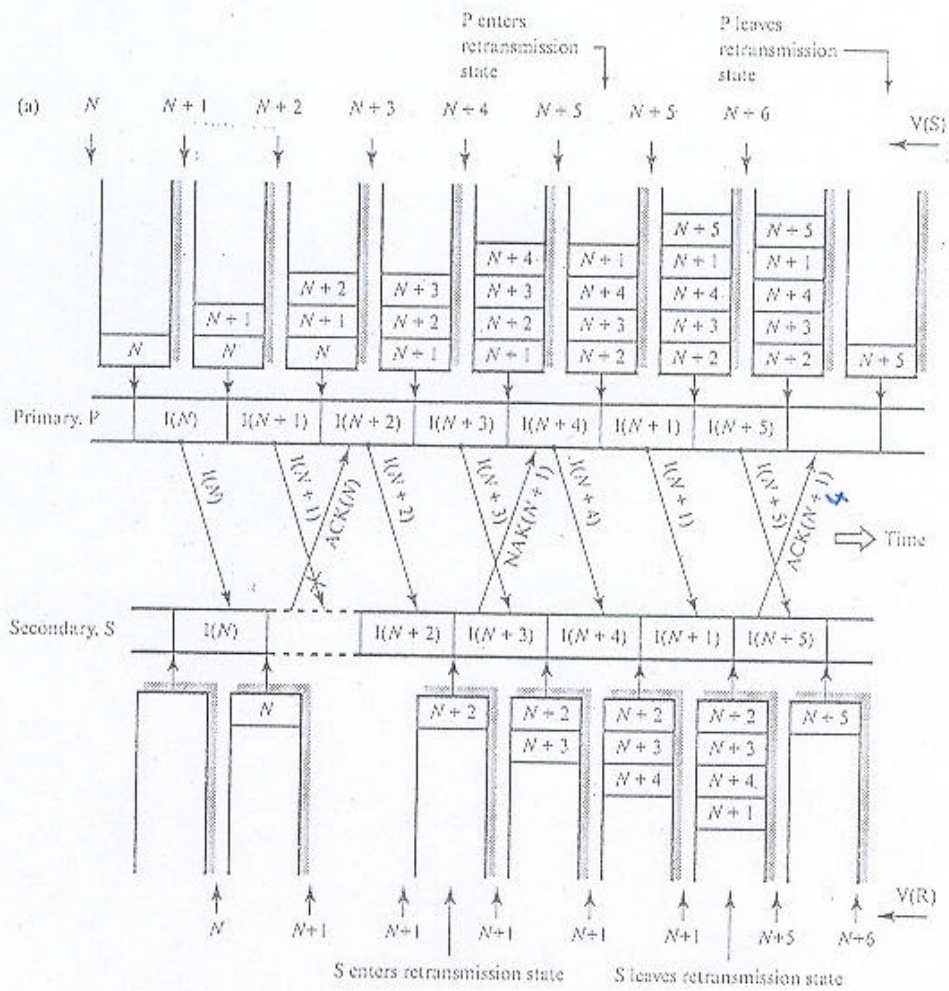
Sel. Rep. P

Corrupted ACK



Sel. Rep. P
Corrupted 1-frame



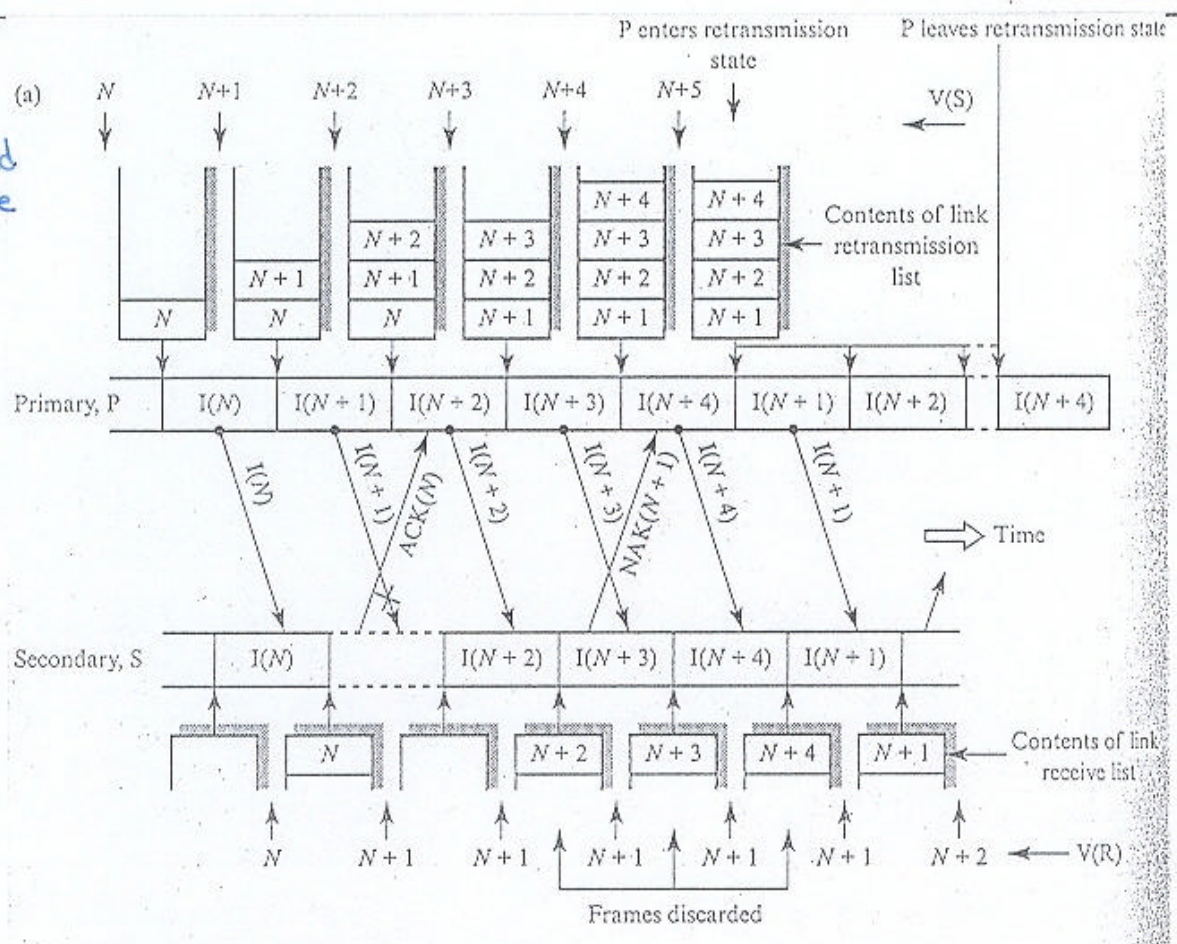


SREJ
A
No retrans.
state
Loss of $I(N+1)$

✗ → Corrupted frame

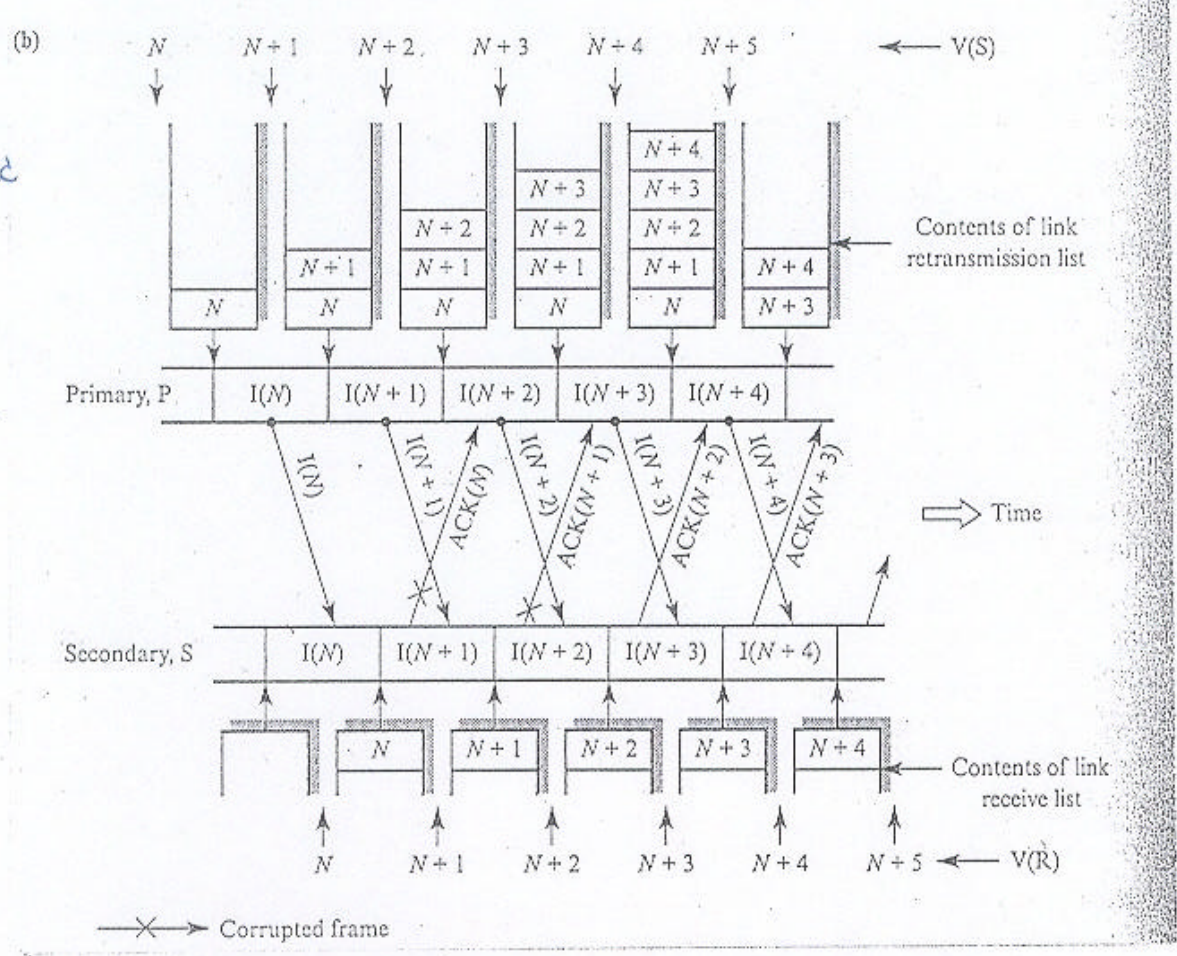
GBN

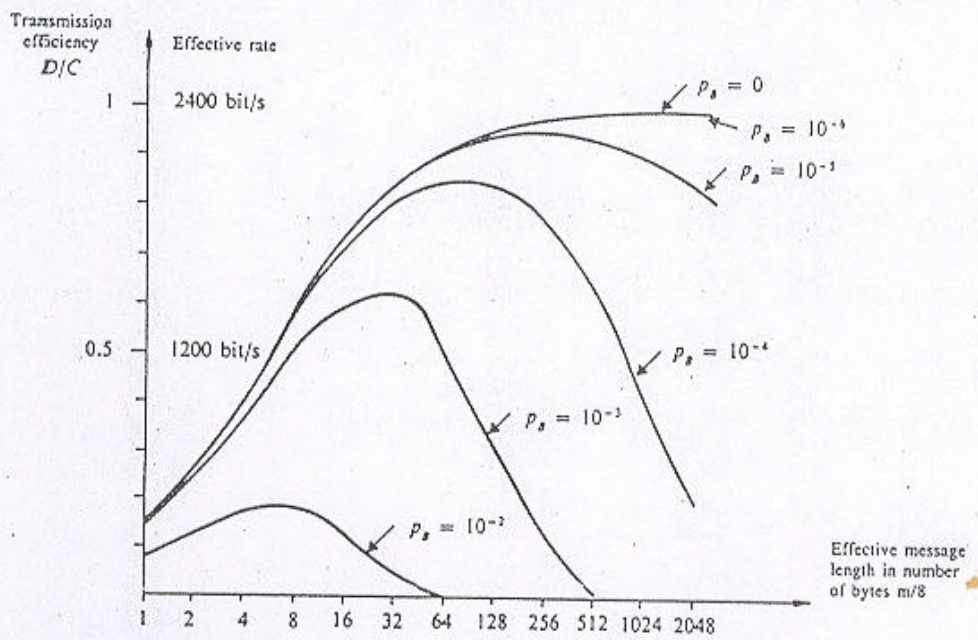
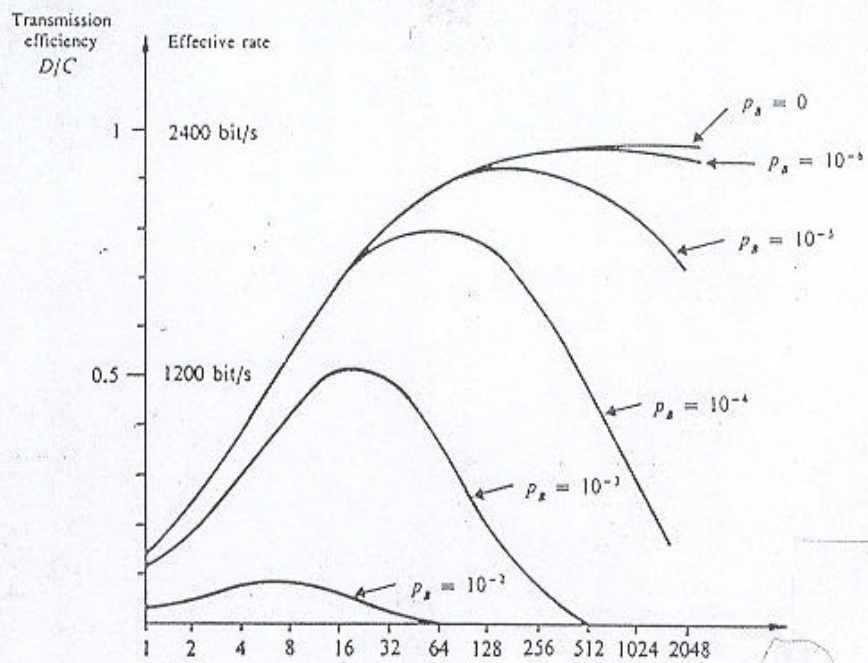
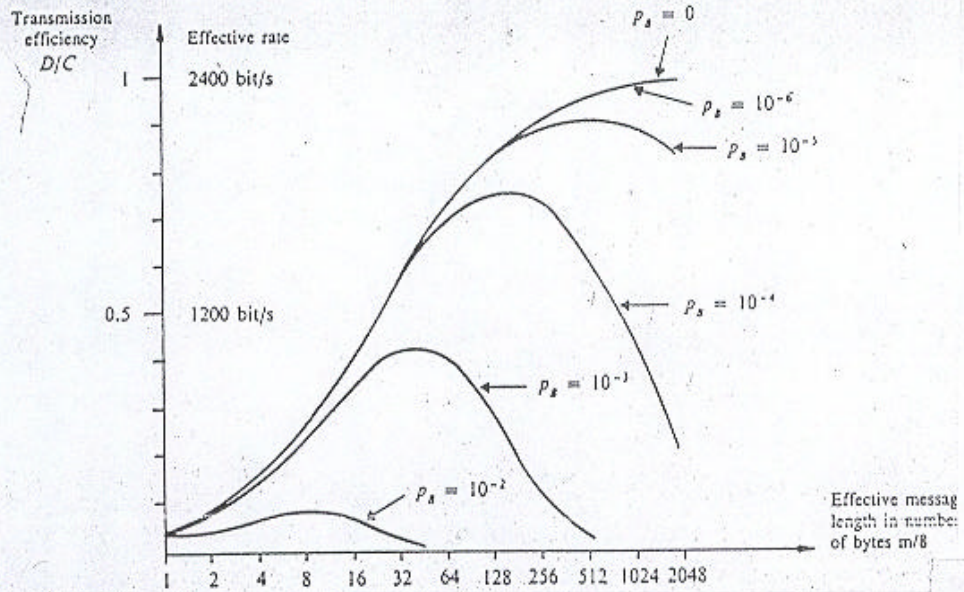
A
Corrupted I-frame



GBN

A
Corrupted ACKs





ARQ metódy

- M – celková dĺžka správy [bit]
- n – dĺžka prenášaného bloku [bit]
- m – dĺžka informačného poľa v bloku [bit]
- r – dĺžka záhlavia v bloku (réžia) [bit]
- n_1 – dĺžka potvrdzovacej správy (dĺžka ACK) [bit]
- R_b – prenosová rýchlosť [bit/s]
- D – efektívna prenosová rýchlosť (TRIB) [bit/s]
- η_b – bitová priepustnosť [%], $\eta_b = D/R_b$
- P_b – bitová chybovosť
- q – bloková chybovosť, $q = 1 - (1 - P_b)^n$
- S – počet blokov, ktoré by bolo možné vyslať za čas ΔS : $S = \Delta S/t_1$

Bloková priepustnosť η_B

$$\eta_B = \frac{\text{úspešne prenesené bloky}}{\text{všetky možné bloky}} \times 100[\%], \quad \eta_b = \frac{m}{n} \eta_B \quad (1)$$

μ – diskrétna náhodná premenná, ktorá vyjadruje počet blokových intervalov spotrebovaných na úspešný prenos jedného bloku.

$$E(\mu) = \eta_B^{-1} \quad (2)$$

Send&Wait

	μ_i	p_i
bez retransimisie	$1 + S$	$1 - q$
1 retransimisia	$2(1 + S)$	$q(1 - q)$
2 retransimisie	$3(1 + S)$	$q^2(1 - q)$
3 retransimisie	$4(1 + S)$	$q^3(1 - q)$
$i - 1$ retransimisií	$i(1 + S)$	$q^{i-1}(1 - q)$

$$\begin{aligned} E(\mu) &= \sum_{i=1}^{\infty} \mu_i p_i = \sum_{i=1}^{\infty} i(1 + S) q^{i-1} (1 - q) = (1 + S)(1 - q) \sum_{i=1}^{\infty} i q^{i-1} \\ &= (1 + S)/(1 - q) \end{aligned} \quad (3)$$

Go Back N

	μ_i	p_i
bez retransimisie	1	$1 - q$
1 retransimisia	$1 + (1 + S)$	$q(1 - q)$
2 retransimisie	$1 + 2(1 + S)$	$q^2(1 - q)$
3 retransimisie	$1 + 3(1 + S)$	$q^3(1 - q)$
$i - 1$ retransimisií	$1 + (i - 1)(1 + S)$	$q^{i-1}(1 - q)$

$$\begin{aligned} E(\mu) &= \sum_{i=1}^{\infty} \mu_i p_i = \sum_{i=1}^{\infty} [1 + (i - 1)(1 + S)] q^{i-1} (1 - q) = \\ &= \sum_{i=1}^{\infty} q^{i-1} (1 - q) + (i - 1)(1 + S) q^{i-1} (1 - q) \\ &= 1 + \frac{q(1 + S)}{1 - q} \end{aligned} \quad (4)$$