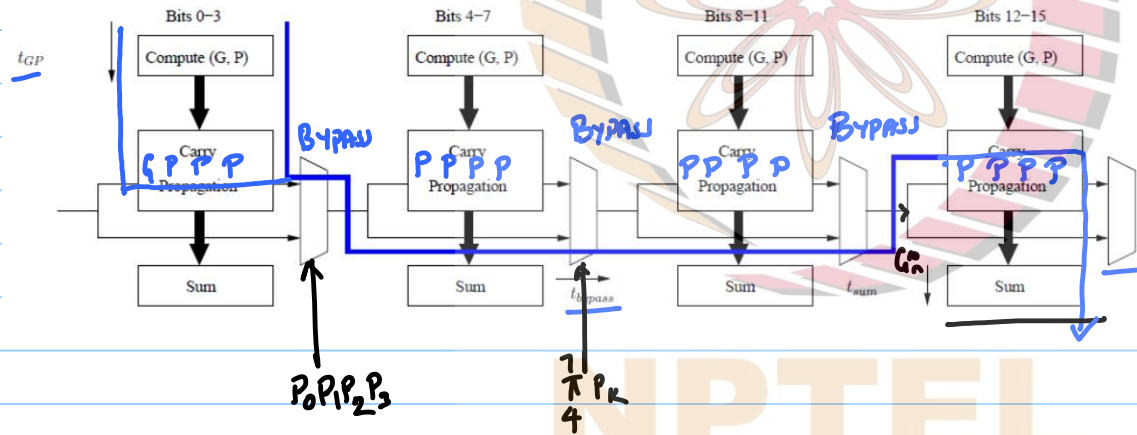


25/10/2019

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MODULE-6- ADDERS

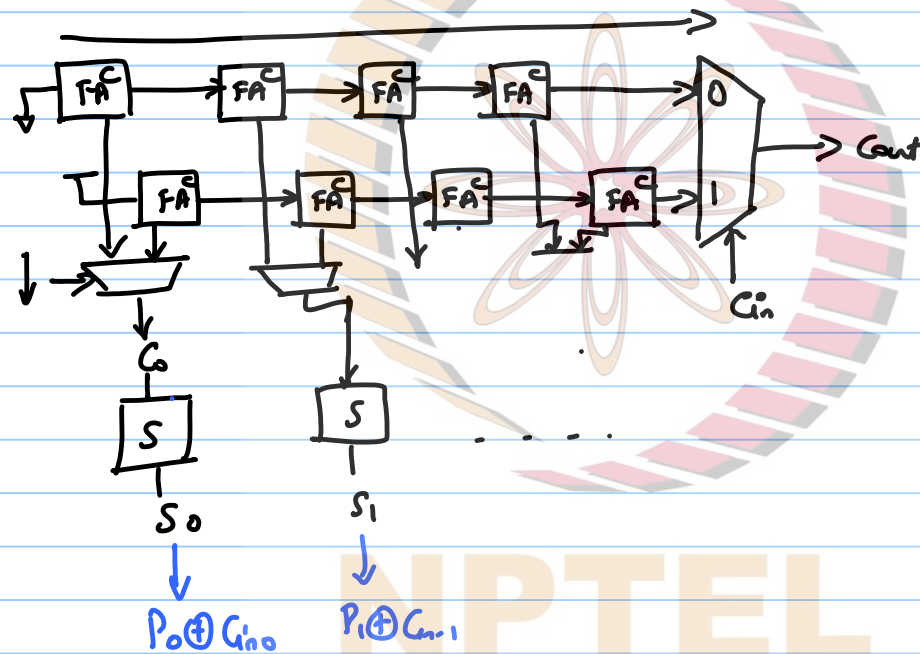
CARRY SKIP ADDER

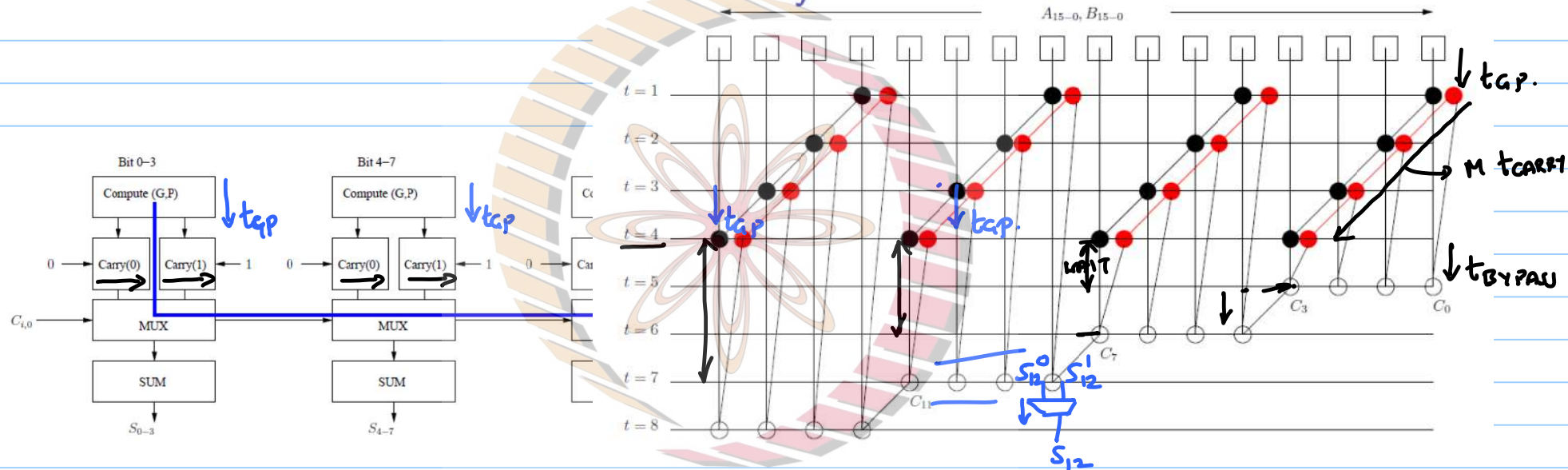


$$t_{\text{ripple}} = t_{\text{sum}} + (N-1)t_{\text{carry}}$$

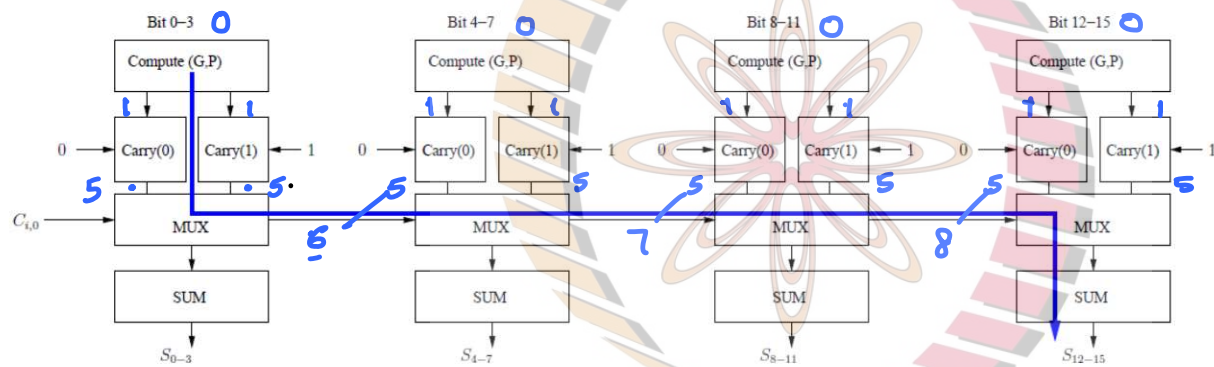
$$t_{\text{CARRY-SKIP}} = t_{GP} + M t_{\text{CARRY}} + \left(\frac{N}{M} - 1\right) t_{\text{bypass}} + (M-1) t_{\text{CARRY}} + t_{\text{sum}}$$

LINEAR CARRY SELECT ADDER





$$\begin{aligned}
 t_{CARRY-SEL} &= t_{GP} + M t_{CARRY} + \left(\frac{N}{M} - 1 \right) t_{BYPASS-CY} + t_{MUX-SUM} \\
 &= t_{GP} + \underline{M t_{CARRY}} + \underline{\frac{N}{M} t_{BYPASS}} + \underline{t_{SUM}}
 \end{aligned}$$

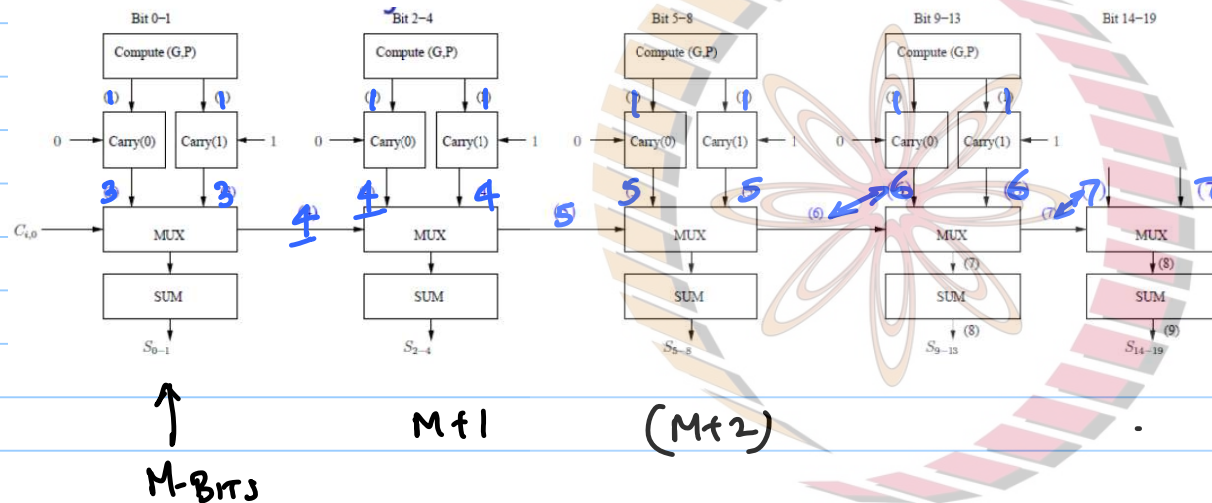


$t_{ap} = 1$
 $t_{sum} = 1$
 $t_{carry} = 1$
 $t_{mux} = t_{bypass} = 1$

NPTEL

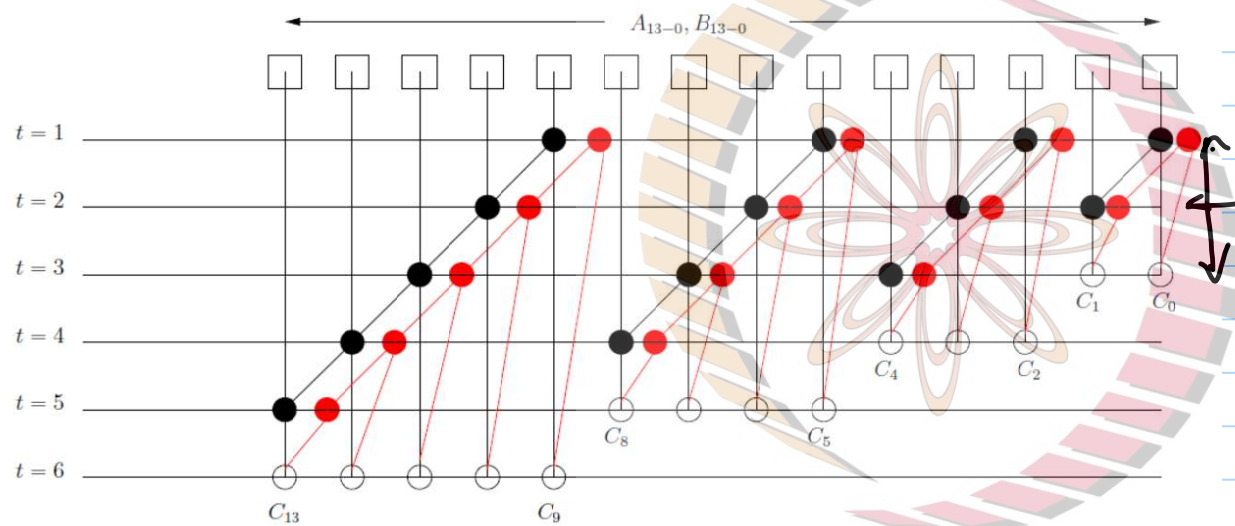
SQUARE ROOT SELECT ADDER

CARRY



$$t_{\text{sa root}} = t_{\text{ap}} + M t_{\text{carry}} + P t_{\text{trans}} + t_{\text{sum}} \downarrow \sim \sqrt{2N}$$

$$\begin{aligned} N &= M + (M+1) + (M+2) + \dots + (M+(P-1)) \\ &= M(P) + \frac{P(P-1)}{2} = (P) \left(M + \frac{P-1}{2} \right) \\ \Rightarrow N &\sim \frac{P^2}{2} \Rightarrow P = \sqrt{2N} \end{aligned}$$



NPTEL