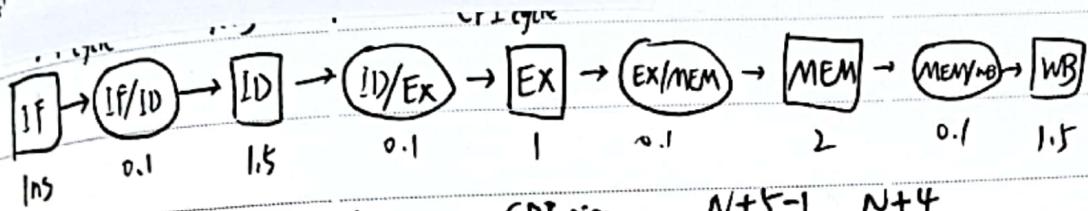


## 第7周 第3章 · 1

$$T = 2.1 \text{ ns}$$



$$\therefore \frac{T_{\text{PIPE}}}{T_{\text{cycle}}} = \frac{2.1}{7} \quad \frac{\text{CPI}_{\text{PIPE}}}{\text{CPI}_{\text{cycle}}} = \frac{N+5-1}{N} = \frac{N+4}{N}$$

例如执行 N 条指令。加速比  $S = \frac{T_{\text{old}}}{T_{\text{new}}} = \frac{7 \text{ ns} \times N}{2.1 \text{ ns} \times (N+4-1)} = \frac{7N}{2.1 \times (N+4)}$   $N \rightarrow \infty$  时  $S = \frac{7}{2.1} = 3.33$

(3) 若有 m 个流水级  $m \rightarrow \infty$  时, 应有  $m-1$  个寄存器, 延迟为  $(m-1) \times 0.1 \text{ ns}$

$$T = 0.1 \text{ ns} \quad S = \frac{T_{\text{old}}}{T_{\text{new}}} = \frac{7 \times N}{0.1 \times (N+m-1)} = \frac{70N}{N+m-1}$$

