

4月4日.

3-1.

(1). $T_{\text{pipe}} = \max \{ \text{IF}, \text{ID}, \text{EX}, \text{MEM}, \text{WB} \} + T_{\text{delay}} = 2.1 \text{ ns}$.

(2). $\frac{T_{\text{old}}}{T_{\text{new}}} = \frac{T_{\text{cycle}}}{T_{\text{pipe}}} \cdot \frac{\text{CPI}_{\text{cycle}}}{\text{CPI}_{\text{pipe}}} = \frac{7}{2.1} \cdot \frac{N}{N+4}$

$\lim_{N \rightarrow \infty} \frac{T_{\text{old}}}{T_{\text{new}}} = \frac{7}{2.1} \approx 3.3$. 放流水行数加速比为 3.3.

(3). $\lim_{\substack{N \rightarrow \infty \\ k \rightarrow \infty}} \frac{7}{2.1} \cdot \frac{N}{N+k-1}$

(3). $k = \infty$ 时. $T_{\text{pipe}} = \frac{T_{\text{cycle}}}{k} + T_{\text{delay}} \approx T_{\text{delay}} = 0.1 \text{ ns}$.

$\lim_{\substack{N \rightarrow \infty \\ k \rightarrow \infty}} \frac{T_{\text{old}}}{T_{\text{new}}} = \lim_{\substack{N \rightarrow \infty \\ k \rightarrow \infty}} \frac{\frac{7}{k+0.1}}{\frac{7}{k+0.1}} \cdot \frac{N}{N+k-1} = 70$.

放加速比极限为 70



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