Licenciatura en ciencia de la computación

Ciclo minimo y Ciclo de Hamilton

Matemática Computacional

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1 Introducción

2 Análisis teorico

Dada la multiplicación de dos matrices A y B

$$AB = \begin{pmatrix} A_{11} & A_{12} \\ A_{21} & A_{22} \end{pmatrix} \begin{pmatrix} B_{11} & B_{12} \\ B_{21} & B_{22} \end{pmatrix} = \begin{pmatrix} A_{11}B_{11} + A_{12}B_{21} & A_{11}B_{12} + A_{12}B_{22} \\ A_{21}B_{11} + A_{22}B_{21} & A_{21}B_{12} + A_{22}B_{22} \end{pmatrix} = \begin{pmatrix} C_{11} & C_{12} \\ C_{21} & C_{22} \end{pmatrix}$$

Se calculan los S y los T

$$\begin{aligned} S_1 &= A_{21} + A_{22} \\ S_2 &= A_{21} + A_{22} - A_{11} \\ S_3 &= A_{11} - A_{21} \\ S_4 &= A_{12} - A_{21} - A_{22} + A_{11} \end{aligned}$$

$$\begin{aligned} T_1 &= B_12 - B_{11} \\ T_2 &= B_{22} - B_{12} + B_{11} \\ T_3 &= B_{22} - B_{12} \\ T_4 &= B_{22} - B_{12} + B_{11} - B_{21} \end{aligned}$$

Se calculan los P.

$$\begin{aligned} P_1 &= A_{11}B_{21} \\ P_2 &= A_{12}B_{21} \\ P_3 &= A_{12}B_{22} - A_{21}B_{22} - A_{22}B_{22} + A_{11}B_{22} \\ P_4 &= A_{22}B_{22} - A_{22}B_{12} + A_{22}B_{11} - A_{22}B_{21} \\ P_5 &= A_{21}B_{11} - A_{21}B_{11} + A_{22}B_{12} - A_{22}B_{11} \\ P_6 &= A_{21}B_{22} - A_{21}B_{12} + A_{21}B_{11} + A_{22}B_{22} - A_{22}B_{12} + A_{22}B_{11} - A_{11}B_{22} + A_{11}B_{22} \\ & \quad +A_{11}B_{12} - A_{11}B_{11} \\ P_7 &= A_{11}B_{22} - A_{11}B_{12} - A_{21}B_{22} + A_{21}B_{12} \end{aligned}$$

Se calculan los U

$$\begin{aligned} U_1 &= A_{11}B_{11} + A_{12}B_{21} \\ U_2 &= A_{21}B_{22} - A_{21}B_{12} + A_{21}B_{11} + A_{22}B_{22} - A_{22}B_{12} + A_{22}B_{11} - A_{11}B_{22} + A_{11}B_{12} \\ U_3 &= A_{21}B_{11} + A_{22}B_{22} - A_{22}B_{12} + A_{22}B_{11} \\ U_4 &= A_{21}B_{22} + A_{22}B_{22} - A_{11}B_{22} + A_{11}B_{12} \\ U_5 &= A_{11}B_{12} + A_{12}B_{22} \\ U_6 &= A_{21}B_{11} + A_{22}B_{21} \\ U_7 &= A_{22}B_{22} + A_{21}B_{12} \end{aligned}$$

De está forma se obtiene que

$$\begin{pmatrix} U_1 & U_5 \\ U_6 & U_7 \end{pmatrix} = \begin{pmatrix} A_{11}B_{11} + A_{12}B_{21} & A_{11}B_{12} + A_{12}B_{22} \\ A_{21}B_{11} + A_{22}B_{21} & A_{21}B_{12} + A_{22}B_{22} \end{pmatrix} = \begin{pmatrix} C_{11} & C_{12} \\ C_{21} & C_{22} \end{pmatrix}$$

Con lo que se demuestra que el algoritmo de strassen es equivalente a la multiplicación de matrices.

3 Explicación algoritmo

4 Formulación experimentos

5 Información de Hardware y Software

5.1 Notebook - Danilo Abellá

5.1.1 Software

- SO: Xubuntu 16.04.1 LTS
- GMP Library
- Mousepad 0.4.0

5.1.2 Hardware

- AMD Turion(tm) X2 Dual-Core Mobile RM-72 2.10GHz
- Memoria (RAM): 4,00 GB(3,75 GB utilizable)
- Adaptador de pantalla: ATI Raedon HD 3200 Graphics

5.2 Notebook - Sergio Salinas

5.2.1 Software

- SO: ubuntu Gnome 16.04 LTS
- Compilador: gcc version 5.4.0 20160609
- Editor de text: Atom

5.2.2 Hardware

- Procesador: Intel Core i7-6500U CPU 2.50GHz x 4
- Video: Intel HD Graphics 520 (Skylake GT2)

6 Curvas de desempeño de resultados

7 Conclusiones