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大型矩阵求逆的实现与应用

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矩阵求逆在科学计算中具有重要应用价值。由于计算机软硬件的限制，传统的计算方法在 PC 上很难实现大型矩阵求逆运算。本文提出了一种求解方法，一方面用内存映射文件存储数据，另一方面用 OpenMP 并行库加快求解速度。运算表明求解速度显著提升，求解矩阵规模明显增大。作为关键的计算步骤，成功地运用在乳腺癌相关基因的研究中。

Table 1. Maximum size of matrix using different methods

Method	Gauss-Jordan	MatLab PINV()	Our Method
Maximum Matrix	2,000 x 2,000	8,000 x 8,000	15,000 x 15,000

Table 2. Performance of Our method

Martrix size	7,000 x 7,000	9,000 x 9,000	13,000 x 13,000	15,000 x 15,000
CPU-time /minute	34	70	203	310

关键词：矩阵求逆；内存映射；OpenMP

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Inverse Matrix by Memory Map and OpenMP

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Matrix inversion is important for scientific computaion. Traditional methods are limited by the specifications of hardware and operating system. Here, a combined method using mameory map with OpenMP that improves the space and speed of the inversion computation, and increases calculated size of martrix significantly. As a key step in calculation, it was successfully applied to explore genes correlatons for breast cancer research.

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