

Performance evaluation: Arnoldi's algorithm

Nicolas Derumigny

ENS Lyon

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```
1  $q_1 = \frac{q}{||q||}$ 
2 for  $k=1 \rightarrow m-1$  do
3    $w = Aq_k$ 
4   for  $j=1 \rightarrow k$  do
5      $h_{j,k} = \langle w, q_j \rangle$ 
6      $w = w - h_{j,k} \cdot q_j$ 
7    $h_{k+1,k} = \frac{||w||_2}{w}$ 
8    $q_{k+1} = \frac{w}{h_{k+1,k}}$ 
```

Algorithm 1: Arnoldi's algorithm



How to measure the execution time?

- Use `time.h`

```
#include <time.h>

int main(){
    clock_t start, end;
    start = clock();
    //program here
    end = clock();
    printf("%f\n", (end-start)/CLOCKS_PER_SEC));
}
```



Complexity

- Time: The matrix-vector product dominates $\Rightarrow O(n^2)$
- Space: The storage of A dominates $\Rightarrow O(n^2)$



i5-2520M

• Sandy Bridge

• 3.5 GHz

• Hyperthreaded
Dual-core

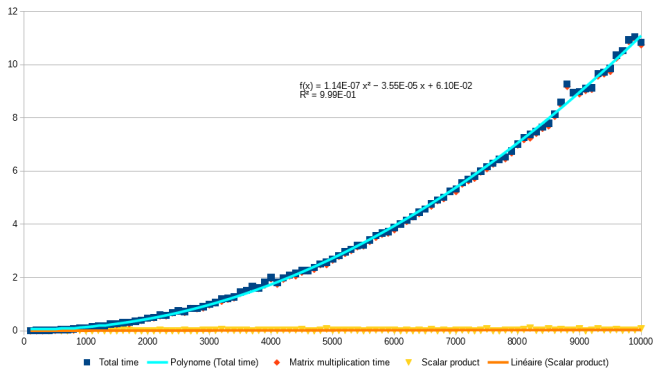


Figure: Performance evaluation on the i5-2520M