Cache miss na multiplicação de matrizes

Introdução à computação paralela e medidas de performance

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21 de agosto de 2025

Performance em MATLAB

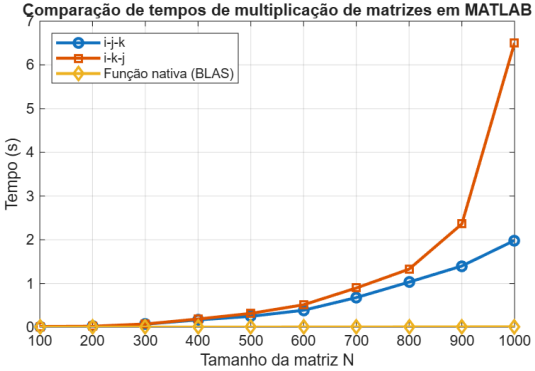


Figura: MATLAB

- Compilador interno *Just-In-Time (JIT)*

Performance em C

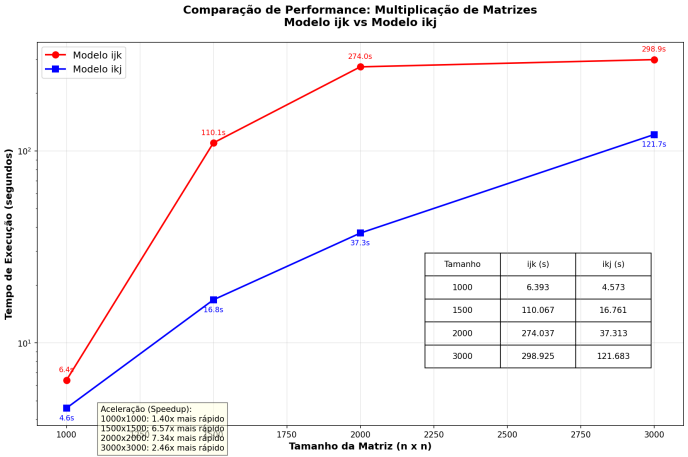


Figura: C

Parâmetros

- Usamos um intervalo de -10000 a 1000 para os valores nas matrizes

```
row[j] = random.randint(-10000, 10000)
```

Ordem de Loop

```
# Ordem ijk (mais lenta)
for i in range(n):
   for j in range(n):
      for k in range(n):  # Acesso não-sequencial à memória
        C[i][j] += A[i][k] * B[k][j]

# Ordem ikj (mais rápida)
for i in range(n):
   for k in range(n):
      for j in range(n):  # Acesso sequencial à memória
         C[i][j] += A[i][k] * B[k][j]
```

Performance em Python

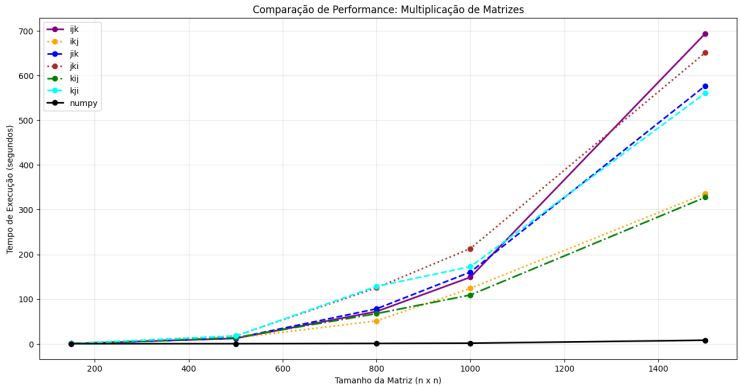
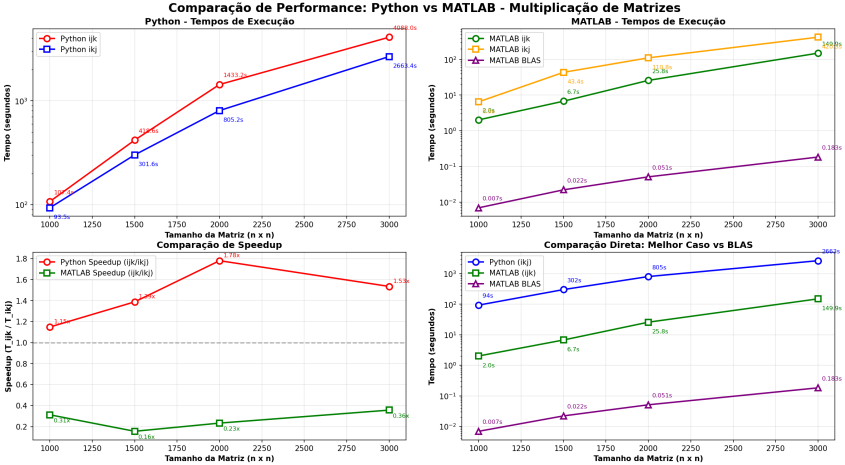


Figura: Python

Pyhton vs Matlab



Tamanho	Python ikj	MATLAB ijk	MATLAB BLAS	Speedup Py	Speedup ML
1000x1000	93.5s	2.0s	0.007s	1.15x	0.31x
1500x1500	301.6s	6.7s	0.022s	1.39x	0.16x
2000x2000	805.2s	25.8s	0.051s	1.78x	0.23x
3000x3000	2663.4s	149.9s	0.183s	1.53x	0.36x

Links

HCP for EDP -  Repositório