

High-performance Matrix Computations

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High Performance and
Automatic Computing

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Linear Algebra operations decomposed into simpler operations.

$$\begin{array}{ll} \text{BLAS-1:} & y := \alpha x + y \quad x, y \in \mathbb{R}^n \\ & \gamma := \alpha + x^T y \end{array}$$

$$\begin{array}{ll} \text{BLAS-2:} & y := Ax + y \quad A, L \in \mathbb{R}^{n \times n}, x, y \in \mathbb{R}^n \\ & y := L^{-1}x \end{array}$$

$$\begin{array}{ll} \text{BLAS-3:} & C := AB + C \quad A, B, C, L \in \mathbb{R}^{n \times n} \\ & C := L^{-1}B \end{array}$$

BLAS	#FLOPS	Mem. refs.	Ratio
Level 1	$2n$	$3n$	2/3
Level 2	$2n^2$	n^2	2
Level 3	$2n^3$	$4n^2$	$n/2$