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# A novel fixed-accuracy variant of the Randomized Interpolative Decomposition algorithm

Emmanuel Agullo<sup>1</sup>, Alfredo Buttari<sup>2</sup>, Karmijn Hoogveld<sup>\*3</sup>, and Theo Mary<sup>4</sup>

<sup>1</sup>Inria – Inria Bordeaux – France

<sup>2</sup>IRIT – Université de Toulouse – France

<sup>3</sup>IRIT – Université de Toulouse – France

<sup>4</sup>LIP6 – Sorbonne Université – France

## Abstract

Finding a robust and efficient fixed-accuracy low-rank approximation algorithm for large matrices is of great interest in numerous applications. Through a literature survey and a unified operational complexity analysis, Randomized Interpolative Decomposition (RID) revealed to be a noteworthy candidate. However, existing variants of this algorithm mainly target the fixed-rank setting. Proposed fixed-accuracy approaches suffer from either unreliable or inefficient stopping criteria. To overcome these shortcomings, we designed a fixed-accuracy variant where the sketch is incrementally augmented until the desired accuracy is reached. The factorization of the sketch is halted when the norm of the trailing submatrix falls below the fixed accuracy. The relevance of this novel variant is assessed through a comprehensive comparative study with existing approaches.

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\*Speaker