

cases	doc_1		doc_2		decision	id
	authors	<ul style="list-style-type: none">Markus BachmayrWolfgang Dahmen			DUPLICATES	1236
	title	Adaptive Low-Rank Methods: Problems on Sobolev Spaces	authors	<ul style="list-style-type: none">M. BachmayrW. Dahmen		
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	urls	<ul style="list-style-type: none">http://arxiv.org/pdf/1407.4919v1http://arxiv.org/abs/1407.4919v1http://arxiv.org/pdf/1407.4919v1	doi	10.1137/140978223		
	id	id7657722914892085375	urls	<ul style="list-style-type: none">https://www.semanticscholar.org/paper/111829496eb96ef74a4fba123069c6fb5bd4f99d		
	abstract	This paper is concerned with the development and analysis of an iterative solver for high-dimensional second-order elliptic problems based on subspace-based low-rank tensor formats. Both the subspaces giving rise to low-rank approximations and corresponding sparse approximations of lower-dimensional tensor components are determined adaptively. A principal obstruction to a simultaneous control of rank growth and accuracy turns out to be the fact that the underlying elliptic operator is an isomorphism only between spaces that are not endowed with cross norms. Therefore, as central part of this scheme, we devise a method for preconditioning low-rank tensor representations of operators. Under standard assumptions on the data, we establish convergence to the solution of the continuous problem with a guaranteed error reduction. Moreover, for the case that the solution exhibits a certain low-rank structure and representation sparsity, we derive bounds on the computational complexity, including in particular bounds on the tensor ranks that can arise during the iteration. We emphasize that such assumptions on the solution do not enter in the formulation of the scheme, which in fact is shown to detect them automatically. Our findings are illustrated by numerical experiments that demonstrate the practical efficiency of the method in high spatial dimensions.	id	id-4545143469606376706		
	versions		abstract	This paper is concerned with the development and analysis of an iterative solver for high-dimensional second-order elliptic problems based on subspace-based low-rank tensor formats. Both the subspaces giving rise to low-rank approximations and the corresponding sparse approximations of lower-dimensional tensor components are determined adaptively. A principal obstruction to a simultaneous control of rank growth and accuracy turns out to be the fact that the underlying elliptic operator is an isomorphism only between spaces that are not endowed with cross norms. Therefore, as the central part of this scheme, we devise a method for preconditioning low-rank tensor representations of operators. Under standard assumptions on the data, we establish convergence to the solution of the continuous problem with a guaranteed error reduction. Moreover, for the case that the solution exhibits a certain low-rank structure and representation sparsity, we derive bounds on the computational complexity, including, in partic...		
			versions			