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Ordered modified Gram-Schmidt orthogonalization revised. (English) Zbl 0856.65043
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B. Nour-Omid, W. S. Dunbar and A. D. Woodbury [Ordered modified Gram-Schmidt orthogonalization, unpublished paper (1991)] proposed an ordered modified Gram-Schmidt algorithm, which was supposed to improve the orthogonality state of the solution. Thorough analysis, even of a simple, planar case, shows [cf. *J. Štuller*, Some comments on the ordered modified Gram-Schmidt orthogonalization, Research Report No. 586, Institute of Computer Science, Academy of Sciences of the Czech Republic, Prague, (1994)] that, yet in the exact arithmetic, one cannot expect to obtain – independently of the forward, reverse, or any other type, including “ordered”, orthogonalization – the desired solution: a vector in the orthogonal complement of the given vectors. For the planar case, some simple rules of the thumb can be given to minimize the error, but we are not sure whether they can directly be generalized to higher dimensions as has been done by Nour-Omid et al. [loc. cit.]. Naturally, in finite precision, the situation is even worse. The unique way out we see in the iterative Gram-Schmidt methods [cf. *A. Björck*, *Linear Algebra Appl.* 197-198, 297-316 (1994; [Zbl 0801.65039](#))] for which we [loc. cit.] presented several algorithms with different criteria of efficiency applied to.

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References:

- [1] Björck, A., Numerics of Gram-Schmidt orthogonalization, *Linear algebra appl.*, 197, 297-314, (1994) · [Zbl 0801.65039](#)
- [2] Nour-Omid, B.; Dunbar, W.S.; Woodbury, A.D., Ordered modified Gram-Schmidt orthogonalization, (1991), unpublished paper
- [3] Štuller, J., Some comments on the ordered modified Gram-Schmidt orthogonalization, () · [Zbl 0856.65043](#)

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