

COARSENING INVARIANCE AND BUCKET-SORTED INDEPENDENT SETS FOR ALGEBRAIC MULTIGRID*

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Abstract. Independent set-based coarse-grid selection algorithms for algebraic multigrid are defined by their policies for weight initialization, independent set selection, and weight update. In this paper, we develop theory demonstrating that algorithms employing the same policies produce identical coarse grids, regardless of the implementation. The coarse-grid invariance motivates a new coarse-grid selection algorithm, called Bucket-Sorted Independent Sets (BSIS), that is more efficient than an existing algorithm (CLJP-c) using the same policies. Experimental results highlighting the efficiency of two versions of the new algorithm are presented, followed by a discussion of BSIS in a parallel setting.

Key words. Algebraic multigrid, parallel, coarse-grid selection.

AMS subject classifications. 65Y05, 65Y20, 65F10.

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