Diagnosis of Regular Structures

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Abstract. This paper introduces an efficient diagnosis algorithm for regular structures (EDARS). The algorithm provides correct, but possibly incomplete, diagnosis if the cardinality of the actual fault set does not exceed a syndrome-dependent bound, asserted by the algorithm itself. EDARS, whose time complexity is $O(nt)$ when executed on t-regular structures of size n, is an efficient one-step diagnosis algorithm for grids structures.
The performance of EDARS, measured in terms of diagnosis correctness and completeness, were evaluated by means of simulation. Grids, hypercubes and Cube-Connected Cycles (*CCC*) structures were considered. Simulation results with grid structures showed the well known influence of structure degree over diagnosis performance. Furthermore, comparisons performed between grids with hypercubes and *CCC*s of same size and degree, showed that, also diameter and bisection width influence the performance of EDARS, especially with respect to diagnosis completeness.

Keywords: System-level diagnosis, PMC model, regular structures, processor grids, hypercubes.