HARDWARE FAULT-TOLERANT SCHEDULING ALGORITHMS

O. A. Abulnaja*, S. H. Hosseini, K. Vairavan****
* King Abdulaziz University, Jeddah, Saudi Arabia, e-mail: abulnaja@kaau.edu.sa
** University of Wisconsin-Milwaukee, Milwaukee, Wisconsin, U.S.A.,
e-mail: {hosseini, kv}@cs.uwm.edu

ABSTRACT. In earlier work we have proposed the concept of the *dynamic group maximum matching* for grouping the system graph into groups of different sizes according to the tasks arriving at the system. Also, we have developed a more efficient hardware fault-tolerant technique called the *Hardware Fault-Tolerant* (*HFT*) technique, where processors and communication channels are subject to failures. Also, we have studied the effect of the HFT technique on the reliability of a task.

In this work, we propose three hardware fault-tolerant scheduling algorithms called the *Hardware Fault-Tolerant* (*FCFS + Smallest Fits First*) (*FCFSSFF*) scheduling algorithm, *Hardware Fault-Tolerant* (*FCFS + Largest Fits Firs*t) (*FCFSLFF*) scheduling algorithm, and *Hardware Fault-Tolerant* (*FCFS + First Fits First*) (*FCFSFFF)* scheduling algorithm. These algorithms are based on the dynamic group maximum matching concept and the HFT technique.

1. INTRODUCTION

Hardware fault-tolerance has been studied in [1] - [3]. Examples of commercially available fault-tolerant systems are Tandem, Stratus, and Sequoia computers [4]-[6].

In an earlier work [7] we have introduced a more efficient new hardware fault-tolerant technique called the *Hardware Fault-Tolerant* (*HFT*) technique, where processors and communication channels are subject to failures. Also, we have evaluated a lower bound for the reliability of a task under the HFT technique. In the following subsections we discuss the work