

Fuzzy-Based Task Scheduling of Mobile Robots in Flexible Manufacturing Systems

Hana Al-Momani and Kasim M. Al-Aubidy

Intelligent & Embedded Systems Research Group,

Faculty of Engineering & Technology, Philadelphia University, Jordan

Email: kma@philadelphia.edu.jo

Abstract— The main objective of this research work is to design and evaluate real time intelligent scheduling algorithms for flexible manufacturing systems. The proposed system has set of programmable CNC machines, load and unload stations, group of mobile robots for material handling, and robot charging station. Each machine, station and robot is considered as a node in a wireless sensor network. Information between FMS units are transferred through a wireless sensor network and used by the main controller. Intelligent algorithms are required to manage and control the FMS environment for tasks scheduling and robot routing. Several simulated case studies will be considered to test and verify the flexibility of the system and the capability of the proposed algorithms to use effectively available machines and mobile robots. Encouraging results are achieved when the performance of the proposed scheduling algorithms is compared with others obtained from similar systems in published literature.

Keywords: *Flexible manufacturing systems, Multi-robot scheduling, Intelligent scheduling, Wireless sensor networks, Fuzzy logic.*