1067-05-2374 **Janet L. Fierson*** (janet.fierson@usma.edu). *Some graph theoretical results for the task mapping problem for parallel computers.* Preliminary report.

Today, massively parallel systems of thousands of processors are being utilized on a regular basis to tackle large-scale problems in a wide variety of fields such as biology, economics, and linguistics. Task mapping, or the assignment of tasks to processors, plays a central role in determining how efficiently solutions may be found. Tasks are the sub-problems into which an application has been decomposed; processors are the individual computing elements of a parallel system.

Both networks and applications may be viewed as graphs. A network may be represented by a processor communication graph, with vertices representing processors and edges representing direct physical connections between processors. An application may be represented by a task interaction graph, with vertices representing tasks and weighted edges representing the amount of communication necessary between tasks. We study some related problems in graph theory for specific classes of graphs. In particular, we consider families representative of common computer architectures. In addition to investigating properties of these graphs and presenting theoretical results, we discuss the practical relevance of our results with regard to task mapping. (Received September 22, 2010)