PvmJobs: A Generic Parallel Jobs Library for PVM

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Abstract

PvmJobs is a general bag-of-jobs library for PVM that works with any user created job structure in a master/slave paradigm. A master can spawn slave processes, schedule and dispatch jobs to slaves, coordinate and synchronize the activities. A slave process obtains a job from the master, performs a set of prescribed tasks, returns results to the master, and obtains the next job. Slaves are organized into separate disjoint groups, called *bags*. Each bag has one master, its own set of slaves, and jobs to perform. A master may use one or more bags simultaneously, and a slave can be a master as well. *PvmJobs* provides a simple FIFO job scheduling mechanism which can be easily replaced by application-defined priority-driven scheduling. The package is written in C and is easy to use by anyone who knows PVM. *PvmJobs* is well documented and should be of interest to any PVM application that uses a master/slave message-passing paradigm. The package has been used in various typical parallel computations and applied in the parallel implementation of the Gröbner Bases Algorithm and the Characteristic Sets Method. The design and implementation of *PvmJobs* is presented. The library routines and their usage are described. Examples are given. General requirements of the library from applications are carefully explained.

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