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A New Asynchronous Parallel Pattern Search

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For many optimization problems arising in science and engineering, the function being optimized depends on the results of a complex simulation. In these situations, derivative information is often unavailable or extremely difficult to obtain. For such problems, we propose the use of Asynchronous Parallel Pattern Search (APPS), a direct search optimization method. APPS has been used successfully on applications ranging from design of forging processes to transmembrane protein structure prediction to wild fire simulation parameter identification. In this talk, we discuss a new APPS algorithm and the associated software, APPSPACK 4.0. The new algorithm can handle bound constraints and has an optional zero-order sufficient decrease condition. The software can be run in serial or parallel and works with stand-alone programs or scripts for computing the value of the objective function.