A PARALLEL IMPLEMENTATION OF A DYNAMIC MESH APPROACH USING SUPERMESH

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Abstract. In dynamic mesh simulations or problems with complex geometries, it is useful to divide the domain into several parts to mesh them separately. As a result, mesh interfaces appear for each pair of subdomains that are interconnected. In this sense, subdomains must be coupled by an interpolation technique or by a remeshing procedure to solve the numerical problem. The interfaces may be non-conformal, and then, connectivity information is required. In parallel computing, communication must be performed if the interfaces are distributed over different processors. In the present work, the implementation of a parallelised strategy for a new interface technique, which is called pseudo-supermesh, is described. In the pseudo-supermesh strategy, a remeshing step is achieved which invalidates the original connectivity between the interfaces. As a consequence, the initial connectivity must be translated into the new mesh state where the interfaces may have a new topology. The present implementation is conceived to handle arbitrary decompose strategies. This feature is a significant advantage in the simulation of dynamic mesh problems, in particular for the simulation of rotating devices. A scalability test is performed using the proposed implementation with different decomposition methods. Finally, the robustness of the computational implementation is evaluated with industrial problems.