

A surface moving mesh method for general surfaces with or without explicit parameterization will be presented. The method is an extension of the moving mesh partial differential equation method that has been developed for bulk meshes. The surface moving mesh equation is defined as the gradient system of an energy function based on mesh equidistribution and alignment, with the nodal mesh velocities being projected onto the underlying surface. Like the bulk mesh situation, it is shown that any mesh generated by the surface moving mesh method remains nonsingular if it is so initially. The main challenges in the development come from the fact that the Jacobian matrix of the affine mapping between the reference element and a simplicial surface element is not square. It is emphasized that the method is developed directly on surface meshes, making no use of any information on surface parameterization. It utilizes surface normal vectors to ensure that the mesh vertices remain on the surface while moving. The new method can apply to general surfaces with or without explicit parameterization since the surface normal vectors can be computed based on the current mesh. A selection of two- and three-dimensional examples will be presented.