BASIC STUDY OF WEIGHTING FUNCTION FOR ELEMENT FREE GALERKIN METHOD

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In the various fields of engineering, the finite element method (FEM) is widely applied to the numerical simulation. Recently, the performance of computer is improved and the technology of the numerical simulation is progressed. Therefore, it is possible to analyze the large-scale and complicated numerical models. However, as for the FEM, there are problems depending on the element, like that the mesh generation is a most time-consuming process for the analysis and the finite element mesh depend on the pattern. In order to solve these problems, the research of mesh-less method that does not need data of the relation of node and element for input data is studied.

The element free galerkin method (EFGM), which is proposed by Belytschko et al. is one of mesh-less method. The EFGM is known as one of the most effective methods of mesh-less methods. Its characteristic is that the approximated funtion is not the shape function of the element. The approximated function is defined by the moving least square method (MLSM), applying only the state value of node in the domain of influence that is defined every evaluation point. Therefore, the EFGM does not need data of element and needs only data of node.

Compared with the FEM, the EFGM has problems. It needs a lot of calculation time and has the many parameters that concern with calculation. But EFGM has great advance. It is effective in the problems depending on the element. And in the case of the MLSM, the interpolation function is high order and continuous.

As for the MLSM, it is important to select the weighting function. The purpose of this research is to consider the effect of the parameters and the weighting function for the MLSM on precision and to select the optimal parameters and the weighting function.