STUDY ON EFFECT OF THREE DIMENSIONAL AKIN SINGULAR ELEMENT FOR STRESS ANALYSIS OF DISSIMILAR MATERIAL JOINTS

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In this study, we focus on singular element proposed by Akin[1], and extend the element to be able to apply stress analysis for three-dimensional dissimilar material joints. In this singular element, it is necessary to employ an order of singularity which is determined by material combination and shape near interface edge to determine shape function in interpolation function. Order of singularity in two-dimensional model can be obtained by methodology proposed by Bogy's theory[2]. However, it is difficult to analitically obtain order of singularity in three-dimensional model. Therefore, numerical method to obtain order of singularity in case of 3D model has developed by Yamada et al. [3]. This method is developed based on the finite element method, and the order of singularity in three dimensional model is calculated by eigen analysis. In this study, the numerical method shown in reference [3] is applied to obtain order of singularity in three-dimensional model, the order of singularity is employed to the singular element in three dimension. In this study, relationship between effect of the singular element and mesh size around singular point is investigated.

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