# New Singular Function Method for Domain Singularities

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Recently, a new singular function(NSF) method was posed to get accurate numerical solution on quasi-uniform grids for two-dimensional Poisson and interface problems with domain singularities by the first author and his coworkers. Using the singular function representation of the solution, dual singular functions, and an extraction formula for stress intensity factors, the method poses a weak problem whose solution is in $H^2(\emptyset)$ or $H^2(\emptyset_i)$. In this paper, we show that the singular functions, which are not in $H^2(\emptyset)$, also satisfy the integration by parts and note that this fact suggests the possibility of different choice of the weak formulations. We show that the original choice of weak formulation of NSF method is critical.