An accurate spline polynomial cubature formula for double integration with logarithmic singularity

ABSTRACT

The paper studied the integration of logarithmic singularity problem $J(\bar{y}) = \iint (\bar{y})\log|\bar{y} - \bar{y}0*|dA$, where $\bar{y}=(,)$, $y0=(0, 0)$ the domain is rectangle $= [r1, r2] \times [r3, r4]$, the arbitrary point $\bar{y} \in$ and the fixed point $\bar{y}0 \in$. The given density function $(\bar{y})$, is smooth on the rectangular domain and is in the functions class $C2, ( )$. Cubature formula (CF) for double integration with logarithmic singularities (LS) on a rectangle is constructed by applying type (0, 2) modified spline function D (P). The results obtained by testing the density functions $(\bar{y})$ as linear and absolute value functions shows that the constructed CF is highly accurate.

Keyword: Logarithmic singularity; Cubature formula