

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

## **ABSTRACT**

The paper studied the integration of logarithmic singularity problem  $J(\bar{y}) = \iint_{\Omega} (\bar{y}) \log |\bar{y} - \bar{y}_0| dA$ , where  $\bar{y} = (x, y)$ ,  $\bar{y}_0 = (x_0, y_0)$  the domain  $\Omega$  is rectangle  $\Omega = [r_1, r_2] \times [r_3, r_4]$ , the arbitrary point  $\bar{y} \in \Omega$  and the fixed point  $\bar{y}_0 \in \Omega$ . The given density function  $(\bar{y})$ , is smooth on the rectangular domain  $\Omega$  and is in the functions class  $C^2$ ,  $(\bar{y}) \in C^2(\Omega)$ . Cubature formula (CF) for double integration with logarithmic singularities (LS) on a rectangle  $\Omega$  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