ON SINGULARLY PERTURBED
$q-$DIFFERENCE-DIFFERENTIAL PROBLEMS WITH AN
IRREGULAR SINGULARITY

ALBERTO LASTRA (JOINT WORK WITH STÉPHANE MALEK)

Abstract

A $q-$analog of a singularly perturbed Cauchy problem with irregular singularity in the complex domain is studied. Our result generalizes a previous result by S. Malek in [1]. First, we construct solutions defined in open $q-$spirals to the origin. Afterwards, we obtain the existence of a formal power series in the perturbation parameter which represents the solution and is the $q-$Gevrey asymptotic expansion of the actual solutions. This is achieved by means of a $q-$Gevrey version of Malgrange-Sibuya theorem.

REFERENCES

[1] S. Malek, Singularly perturbed $q-$difference-differential equations with irregular singularity, J. Dynam. Control. Syst. 17 (2011),no.2.