

Extending The Product Integration Method

Raouia BEN DAHMANE^{*1}, Khanssa BEN DAHMANE¹ and Hanane KABOUL¹

¹Department of mathematics, University of Biskra, Biskra, Algeria

* raouia.bendahmane@univ-biskra.dz

khanssa.bendahmane@univ-biskra.dz

hanane.kaboul@univ-biskra.dz

Abstract – We examine a weakly singular kernel Fredholm integral equation of the second kind in $\Lambda^1([\alpha; \beta]; \mathbb{R})$ and provide adequate conditions for the solution's existence and uniqueness. Furthermore, we expand the product integration technique initially proposed in $\Lambda^1([\alpha; \beta]; \mathbb{R})$ and adapt it to $\Lambda^1([\alpha; \beta] [\chi; \delta]; \mathbb{R})$. To demonstrate its effectiveness, we present numerical evidence along with an application in Astrophysics.

Keywords – Fredholm Integral Equation, Weakly Singular Kernel, The Product Integration.