

UNIVERSITI TEKNOLOGI MARA

TECHNICAL REPORT

**NUMERICAL SOLUTION OF VOLTERRA-FREDHOLM
INTEGRO DIFFERENTIAL EQUATION USING BANACH
CONTRACTION METHOD**

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IN THE NAME OF ALLAH, THE MOST GRACIOUS, THE MOST MERCIFUL

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ABSTRACT

In this research, our main goal is to apply the Banach Contraction Method (BCM), which outlines the conditions required for a fixed point's existence and uniqueness. BCM is an essential tool in the idea of metric spaces as a fundamental understanding. Additionally, it offers a numerical algorithm to approach those fixed points and suitable requirements for the fixed points of specific classes of self-mappings. With this approach, BCM offers an ongoing procedure called iteration by means of which we can get closer approximations to a problem's solution and error bounds. There are many ways to solve nonlinear problems. There are other strategies used, such as the Adomian Decomposition Method (ADM), Variational Iteration Method (VIM), Newton Method, Homotopy Perturbation Method (HPM), Sumudu Decomposition Method (SDM), Laplace Decomposition Method (LDM) and others. It was therefore proposed that the Volterra-Fredholm Integro Differential Equation (VFIDE) may be resolved via the BCM. This report consist of research finding that have been conducted with the purpose to achieve two objectives. The purpose of this study was to solve the VFIDE by using BCM and to analyse the accuracy and efficiency of the BCM by obtaining the exact value. Using Maple Software, the BCM will attempt to solve VFIDE in the most straightforward manner possible.