ABSTRACT

In this thesis we investigate some of the qualitative properties of dynamic integral equations on arbitrary time scale $T$. A time scale is nonempty closed subset of the real numbers. First, we investigate the wellposedness of some kinds of nonlinear integral equations of Volterra-Fredholm type. We consider the following two different types

\[ x(t) = f(t, x(t)) + \int_{a}^{t} h(t, s, x(s)) \Delta s \Delta s, \quad t \in I_{T} := [a, \infty) \cap T \]  
\[ x^{h}(t) = f(t, x(t)) + \int_{a}^{t} h(t, s, x(s)) \Delta s \Delta s, \quad t \in I_{T} := [a, \infty) \cap T \]

where $f : I_{T} \times X \to X$, $h : I_{T} \times X \to X$, and $X$ is a Banach space.

Secondly, we apply the method of upper and lower solutions to the equation

\[ x(t) = f(t) + \int_{a}^{t} k(t, s, x(s)) \Delta s, \quad t \in [a, b]_{T} = [a, b] \cap T \]

where $f : [a, b]_{T} \to \mathbb{R}$ and $k : [a, b]_{T} \times [a, b]_{T} \to \mathbb{R}$.

Finally we study Hyers-Ulam stability and Hyers-Ulam-Rassias stability of a Volterra integral equation of the first kind

\[ x(t) = f(t) + \int_{a}^{t} k(t, s) x(s) \Delta s, \quad t \in I_{T} \]

where $I_{T}$ is a time scale interval, $f : I_{T} \to \mathbb{R}$ and $k : I_{T} \times I_{T} \to \mathbb{R}$. 