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ON A FRACTIONAL NON LINEAR BIOLOGICAL MODEL PROBLEM AND ITS APPROXIMATE SOLUTIONS THROUGH VOLTERRA INTEGRAL EQUATION

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ABSTRACT

In this work, we present a time fractional and non linear in space biological model problem. Then, we convert this problem into Volterra integral equation through introducing tridimensional basis and then obtain its approximate solutions through this integral equation and also analyze them by computation.

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Keywords : Time fractional and non linear in space differential equations, Volterra integral equations, Fractional Caputo derivative, the Hölder's inequality, Approximation to Laplace transformations.

1. Introduction. Various non linear equations occur in physical, chemical and biological sciences for example: Duffing's equation, van der Pol's equation, Raleigh equations and these equations have studied and solved by many methods for some of them (see, van der Pol [19], Kryloff and Bogoliuboff method, (Pipes [18, p.688]), Lalesco [12], Raleigh [20], Shohat [22], Pipes ([17], [18]) and Jacobsen [5]).

Recently, the initial value biological population problem has introduced and studied due to Liu et al. [14]:

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