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DISCRETE – TIME EPIDEMIC MODELS[1]

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A first order difference equation

$$x_{n+1} = (1 - x_n)(1 - e^{-Ax_n}), \quad n = 0, 1, ... \tag{1}$$

is a variation of the classical Reed-Frost epidemic model, where A is a parameter which can be interpreted as infectivity of the disease ([1]).

In [2] authors consider similar second order difference equation

$$x_{n+1} = (1 - x_n - x_{n-1})(1 - e^{-Ax_n}), \quad n = 0, 1, ... \tag{2}$$

and formulate Open Problem 6.10.14 about equation (2): investigate the boundedness character, the periodic nature, and the asymptotic behavior of the solution of (2); extend and generalize. In [3] model (2) was generalized as follows:

$$x_{n+1} = (1 - \sum_{j=0}^{k-1} x_{n-j})(1 - e^{-Ax_n}), \quad n = 0, 1, ... \tag{3}$$

We offer research about a difference equation

$$x_{n+1} = (1 - x_n - x_{n-1})(1 - e^{-Ax_n - Bx_{n-1}}), \quad n = 0, 1, ... \tag{4}$$

where A and B are parameters which can be interpreted as infectivity of the disease in two time moments.

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