J M S K

E-ISSN: 2614-8811

JURNAL MATEMATIKA. STATISTIKA & KOMPUTASI

https://journal.unhas.ac.id/index.php/jmsk/index

Vol. 17, No. 2, 267-279, January, 2021

DOI: 10.20956/jmsk.v17i2.11984

Stability Analysis of Divorce Dynamics Models

Syamsir[1*], Syamsuddin Toaha[2*], Kasbawati[3*]

Abstract

This article examines the mathematical model of divorce. This model consists of four population classes, namely the Married class (M), the population class who experiences separation of separated beds (S), the population class who is divorced by Divorce (D), and the population class who experiences depression or stress due to divorce Hardship (H). This study focuses on the stability analysis of divorce-free and endemic equilibrium points. Local stability was analyzed using linearization and eigenvalues methods. In addition, the basic reproduction number R_0 is provided via the next generation matrix method. The existence and stability of the equilibrium point are determined from R_0. The results showed that the rate of interaction between population M and populations other than H is very influential on efforts to minimize divorce. Divorce can be minimized when the transmission rate is reduced to $R_0 < 1$. Reducing the transmission rate and increasing the rate of transfer from split bed class to married class can turn divorce endemic cases into non-endemic cases. A numerical simulation is given to confirm the analysis results.

Keywords: *Divorce Dynamics, Mathematical Model, Equilibrium Point, Stability Analysis, basic reproduction numbers.*

1. Introduction

In a marriage, everyone wants a happy, eternal, and prosperous home life, in accordance with the objectives of marriage as stated in Law No.1 of 1974 ([1,9]). However, not everyone can form a family that they aspire to, this is due to divorce, both death divorce, divorce talaq, and divorce based on the judge's decision [1]. The problem of the dynamics of the divorce epidemic is one of the most familiar problems in society. Several previous studies have modeled problems related to the dynamics of this divorce [15]. For example, the mathematical model of divorce dynamics developed by Patience Pokuaa Gambrah, et al [6], which examines the impact of counseling in divorce cases. Then the research conducted by Patience Pokuaa Gambrah and Yvonne Adzadu [7] divided the mathematical model into 3 compartments, namely marriage (M), separated (S), Divorced (D). In this study, the researchers drew a conclusion that the divorce epidemic can not

* *Program Studi Magister Matematika, FMIPA-UNHAS*

Email: [1] syamsir.cagur94@gmail.com, [2] syamsuddint@yahoo.com, [3] kasbawati@gmail.com