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? Corresponding author NUMERICAL STUDY FOR ZIKA VIRUS TRANSMISSION WITH BEDDINGTON-DEANGELIS INCIDENCE RATE Puji Andayani1,*, Lisa Risfana Sari1, Agus Suryanto2 and Isnani Darti2 1Universitas International Semen Indonesia 61122, Gresik, Indonesia 2Department of Mathematics Faculty of Mathematics and Science Brawijaya University 65145, Malang, Indonesia Abstract In this paper, we focus on the behavior of Zika virus transmission with Beddington-DeAngelis incidence rate. The main purpose of this work is to identify the recovery time and predict the endemic condition of Zika virus. The equilibrium points of the system are identified by Jacobian.

The basic reproduction number exhibits the natural compartment of disease transmission investigated using next generation matrix (NGM) method. The sensitivity indexes of the parameter are computed to investigate the intervention strategies to prevent the Zika virus transmission. The stability condition of each equilibrium point is shown by numerical simulation. According to numerical solutions, the disease-free and endemic conditions occur for the specific value of the basic reproduction number. Pidaniiasa Saigusyao ana Dri 146 Itodton Reels ceit vesudid hetamisoofZi r, wn ageedmisocurei eti ra.

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Study for Zika Virus Transmission ... 153 systems are free from Zika virus. The following table describes the condition of disease-free or the infected human is a recovery in a certain time.

In this work, we assume that the human density ?the amount of population per- ? 2 km in a province x is h N [2], and the mosquitoes density is 0.036, while human density is v N [12]. Then we consider Table 2 and assume that the probability of direct transmission rate is 0.01, the probability of transmission rate between human and infected mosquitoes is 0.01 and the probability of transmission rate between mosquitoes and infected human is 0.01. The parameters of preventive conditions, namely, 12 . 0 1 ? ? and . 1 . 0 3 ? ? Table 2.

Table of recovery time with assumed total population in human province resident in Indonesia Province h ? v ? Recovery time (days) East Java 0.03426795 2.090571 110 Lampung 0.0098631 0.427266 75 West Java 0.055638 0.991310 120 Central Java 0.0434145 0.8782111 115 Bali 0.0302637 1.846286 100 NTB 0.010959 0.668571 80 Maluku 0.0015174 0.092571 70 Papua 0.0004215 0.0774278 70 Indonesia 0.0056481 0.344571 70 Based on Table 2 and the previous assumption, we can see that the Zika virus will be extinct at least in 70 days. The other case of stability condition is when . 1 0 ? R This case is hard to analyze analytically, then the numerical simulation is used.

Let us consider Table 1 and choose the parameter values of , 00843 . 0 ? ? h , 002 . 0 1 ? ? , 002 . 0 2 ? ? , 003 . 0 3 ? ? , 05 . 0 1 ? ? , 5 . 0 2 ? ? . 5 . 0 3 ? ? Then we have the following result. Pidaniiasa Saigusyao ana Dri 154 Tae Tbl ofeiitndeorah paatr t stm (Prmee esiitneltreain iceig dcan Rnk h ? 05829 h ? b10, 0 R b25 5 h ? –.27872 h ? b10, 0 R b25 4 1 ? –.70610 1 ? b10, 0 R b74 3 2 ? 0 2 ? b10, 0 R b0% 9 3 ? –.04937 3 ? b10, 0 R b0. 8 1 ? 09753 1 ? b10, 0 R b99 2 2 ? 006236 2 ? b10, 0 R b0. 7 3 ? 006236 3 ? b10, 0 R b0. 7 a ~ –.96524 ? b10, 0 R b99 1 v ? 00623 v ? b10, 0 R b0. 7 v ? –.0104 v ? b10, 0 R b0. 6 Fge Nrclrst mode (wn .

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