

## Analisis bifurkasi suatu model terorisme = A bifurcation analysis of a terrorism model

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### Abstrak

[Pada tesis ini dibahas suatu model terorisme di Indonesia. Model matematika ini dikembangkan dengan membagi populasi manusia ke dalam empat kelas, yaitu kelas umum (G), kelas bibit (S), kelas teroris aktif (FA), dan kelas teroris yang ada di lembaga pemasyarakatan (FP). Analisis dinamik model berupa kajian titik ekuilibrium seperti jaminan eksistensi, kestabilan dan bifurkasi dibahas dalam tesis ini. Analisis bifurkasi terhadap model yang telah dikonstruksi dilakukan dengan menggunakan software Matcont. Dari hasil kajian eksistensi titik ekuilibrium diperoleh tiga titik ekuilibrium, yaitu titik ekuilibrium bebas teroris  $E_0 = (1; 0; 0)$ , titik ekuilibrium teroris yang berupa  $E_1 = (g_1; s_1; v_1)$  dan  $E_2 = (g_2; s_2; v_2)$ . Titik ekuilibrium  $E_0$  ada tanpa syarat, sedangkan  $E_1$  dan  $E_2$  ada dengan syarat tertentu. Berdasarkan hasil analisis kestabilan diperoleh  $E_0$  stabil asimtotis,  $E_2$  stabil, sedangkan  $E_1$  tak stabil. Simulasi numerik diberikan dalam beberapa kondisi dengan memanfaatkan software Mathematica 10.0.

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In this thesis a model of terrorism in Indonesia is discussed. This model is developed by dividing the human population into four classes, namely general class (G), seed of terrorist class (S), active terrorist class (FA), and terrorist who are in a prison (FP). Dynamical analysis such as study about equilibrium point such as existence, stability, and bifurcation are discussed in this thesis. A bifurcation analysis of the model is performed using software Matcont. From the results of the study of the existence of the equilibrium point, it is obtained three equilibrium points, namely terrorism-free equilibrium point  $E_0 = (1; 0; 0)$ , and terrorism equilibrium points  $E_1 = (g_1; s_1; v_1)$  and  $E_2 = (g_2; s_2; v_2)$ . The equilibrium point  $E_0$  exists unconditionally, whereas  $E_1$  and  $E_2$  exist with certain conditions. From the analysis of stability equilibrium points obtained that  $E_0$  is asymptotically stable,  $E_2$  is stable, and  $E_1$  is unstable. Numerical simulation is given in some conditions by using software Mathematica 10.0., In this thesis a model of terrorism in Indonesia is discussed. This model is

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