INTISARI

PEMODELAN MATEMATIKA PENYEBARAN VIRUS *CORONA* 2019 (COVID-19) DENGAN KARANTINA

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Pada penelitian ini dibahas tentang model matematika penyebaran COVID-19 dengan karantina. Dalam hal ini, populasi dibagi menjadi 6 kelas, yakni kelas *suspected*, *exposed*, *isolated*, *infected*, *hospitalized*, dan *recovered*. Pada penelitian ini, dibentuk model matematika yang memodifikasi model SEIR dengan mempertimbangkan adanya kelas karantina dan *hospitalized*. Selanjutnya, dicari titik ekuilibrium bebas penyakit dan endemik dan diselidiki sifat kestabilan dari kedua titik ekuilibrium tersebut. Titik ekuilibrium bebas penyakit dan endemik stabil asimtotik lokal jika memenuhi syarat-syarat tertentu. Metode *Next Generation Matrix* digunakan untuk menentukan bilangan reproduksi dasar dan kestabilan global titik ekuilibrium bebas penyakit. Simulasi numerik digunakan untuk menggambarkan perilaku dari model yang telah diperoleh kemudian berdasarkan analisis sensitivitas bilangan reproduksi dasar, diperoleh beberapa parameter yang berpengaruh terhadap penyebaran COVID-19.
Kata Kunci : COVID-19, karantina, bilangan reproduksi dasar.

ABSTRACT

MATHEMATICAL MODELLING FOR THE SPREAD OF CORONAVIRUS DISEASE (COVID-19) BY ISOLATION

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This research discussed about mathematical model for the spread of coronavirus disease (COVID-19) by isolation. In this case, the population was divided into 6 classes, they are *suspected*, *exposed*, *isolated*, *infected*, *hospitalized*, and *recovered*. In this research, a modified SEIR model was formulated by considering the *hospitalized*, and *isolated* classes. Furthermore, the free disease and endemic equilibrium points were found along with the local stability for both equilibrium points. Both of equilibrium points were locally asymptotically stable if the certain conditions was satisfied. The *Next Generation matrix* method was used to determine the basic reproduction number and global stability of free disease equilibrium point. Numerical simulation was presented to describe the model's behavior, and based on the elasticity analysis on the basic reproduction number, several parameters that affect COVID-19 spreading was exist.
Keywords : COVID-19, isolation, basic reproduction number.