Review of: "Qualitative Analysis of a Time-Delay Transmission Model for COVID-19 Based on Susceptible Populations With Basic Medical History"

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Potential competing interests: No potential competing interests to declare.

This paper constructs COVID-19 epidemic model with time-delay, which denote the incubation period, the time from exposure to the onset of the disease. The existence and stability of equilibrium points of delayed COVID-19 epidemic model are discussed in this paper, furthermore by Lyapunov function, the author prove that the equilibrium point is globally stable, At last, some simulations are given to demonstrate the influence of incubation delay on the infective population.

Comment on manuscript “Qualitative Analysis of a Time-Delay Transmission Model for COVID-19 Based on Susceptible Populations with Basic Medical History”.

This paper constructs COVID-19 epidemic model with time-delay, which denote the incubation period, the time from exposure to the onset of the disease. The existence and stability of equilibrium points of delayed COVID-19 epidemic model are discussed in this paper, furthermore by Lyapunov function the author prove that the equilibrium points is globally stable. At last, some simulation are given to demonstrate the influence of incubation delay on the infected population. There are several comments in this paper:

1. Line-3 of Page 5, Why $x=(I,S_1,S_2)^{\mathrm{T}}$ not $x=(S_1,S_2,I)^{\mathrm{T}}$? Line-4 of Page 5, in my opinion, there is no use for equation $\frac{dx}{dt}=F(x)-V(x)$

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please give the role of equation $\frac{dx}{dt} = F(x) - V(x)$ in this paper.

2. Line-17 of Page 6, $\leq \frac{A}{d} - \frac{me^{d\tau}}{A}$ should be $\leq \frac{d}{A} - \frac{me^{d\tau}}{A}$.

3. Line-9 of Page 7, the font size of "the equation can be deformed into" should be larger.

4. Line-14 of Page 9, $\begin{pmatrix} U \\ V \\ W \end{pmatrix} = \begin{pmatrix} c_1 \\ c_2 \\ c_3 \end{pmatrix} e^{\lambda\tau}$ should be $\begin{pmatrix} U \\ V \\ W \end{pmatrix} = \begin{pmatrix} c_1 \\ c_2 \\ c_3 \end{pmatrix} e^{\lambda t}$,

Line-15,16,17 of Page 9, expression S_1, S_2, I should be S_1^*, S_2^*, I^*.

5. Line-5 of Page 11, Line-16 of Page 12, $E_0 = (S_{10}, S_{20,0})$ should be $E_0 = (S_{10}, S_{20,}0)$.

6. Line-19 of Page 12, $e0$ should be E^*.

7. Please explain Line-4 of Page 14, why

$I^*[e^{-d\tau}\beta_1\beta_2[S_1^*(\beta_1 I^* - d) + S_2^*(\beta_2 I^* - d)] + m(\beta_1 d + \beta_2 d + \beta_2\theta)] > 0$ hold?