東北大学大学院情報科学研究科
純粋・応用数学研究センター

情報数理談話会のお知らせ

日　時：　2022年7月13日㈬ 13:30 より 14:30 まで
場　所：　Google Meet によりオンラインで開催
　　　　　※参加方法はホームページをご覧下さい

講演者：　Ishfaq Ahmad 氏（東北大学大学院情報科学研究科）
題　目：　Population Dynamics Model for the Effect of Isolation on Final Epidemic Size
備　考：　この情報数理談話会は課程博士予備審査会を兼ねています

[概 要] Human daily activities contribute to the spreading of infectious diseases in the community, as people interaction comes there is a risk of propagation of infection. To reduce the risk about the propagation of infectious diseases in community the "quarantine/isolation" strategy is important policy. As isolation requires a certain specific place with highly organized conditions to isolate the infective from other community members, there is always a certain capacity for isolation. If the capacity for isolation is small enough then the isolation strategy may be broken down on the way of the epidemic process. We considered a simple SIR model with a four-dimensional system of ordinary differential equations to investigate the influence of limited isolation capacity on the final epidemic size, defined as the total number of infected individuals at the end of the season. For the model, we assumed that any isolated individual is not discharged in the season. The results of the mathematical analysis show that there exists a necessary and sufficient condition under that the isolation reaches its capacity at a finite time during the epidemic process. Further, the final epidemic size is monotonically decreasing in terms of isolation capacity. The model provides theoretical frameworks for understanding the best-estimated scenario for the isolation enough to avoid reaching the capacity at any finite time during the epidemic process and the dependence of critical isolation capacity on the characteristics of the epidemic dynamics.

ホームページ：https://www.math.is.tohoku.ac.jp/research/colloquium.html