The dynamic reproduction index: precise determination from the incidence and insights based on new state diagrams

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Incidence, the number of infected people and the reproduction number R are the most important parameters for assessing the state of a pandemic. While the number of new infections is relatively easy to determine, this is not the case for the number of infected people and therefore also for R. This leads directly to the fact that instead of a correct reproduction number R, which would be directly related to the two other variables mentioned above, a less meaningful variable is often given as an alternative, the value of which is always in the neighbourhood of "R=1" [1].

Under the premise that an infection event follows a differential equation, it follows that R as an eigenvalue can be calculated practically exclusively from the infection figures alone - and thus a value for the number of infected persons is also known [2].

The use of the "correct" R also provides extraordinary insights into the dynamics of the pandemic and is very well suited to assess the situation of the pandemic or to serve as an early warning system. We present different types of status diagrams of the course of the pandemic, in which, for example, the start of a wave can be seen very significantly and on a daily basis (plotting "R vs. Incidence").

The data we use for the course of Covid-19 were published continuously by the Robert Koch Institute (Berlin/Germany).

[1]   an der Heiden, M, Hamouda, O, "Schätzung der aktuellen Entwicklung der SARS-CoV-2-Epidemie in Deutschland - Nowcasting", **Epid Bull 2020(17)10–16**, doi: 10.25646/6692.4

[2]   Conradt RNJ, Herminghaus S. „The Dynamic Reproduction Index: Accurate Determination fromIncidence and Application for an Early Warning System" **American J Epidemiol Public Health. 2022, (6.2)30-37**, doi: 10.37871/ajeph.id56

Biography

Robert received his PhD in physics in 1996. Stations: University of Ulm, University of Constance, own company. Fields of activity: Polymer physics, biophysics, cryogenics, solids, quantum systems, surfaces, synchrotron and neutron scattering, measurement and control systems, scientific data analysis, renewable energies, music, sailing…

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