Meeting the challenges of COVID-19

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The novel coronavirus disease (COVID-19) has posed and is posing a great threat to the world by causing many deaths and enormous economic damage worldwide. In this talk, we review some compartmental models used in the literature to investigate the epidemiological trend of COVID-19 in different parts of the world and to assess the potential role of multiple preventive measures and strategies imposed by the authorities. The well-posedness of the models are discussed, together with conditions under which the COVID-19 may become extinct or persist in the population.

References

- [1] BUSHNAQ, S, SAEED, T, TORRES, DFM, ZEB, A, Control of COVID-19 dynamics through a fractional-order model, Alexandria Engineering Journal 60(4), 3587–3592 (2021).
- [2] Lemos-Paião, AP, Silva, CJ, Torres, DFM, A new compartmental epidemiological model for COVID-19 with a case study of Portugal, Ecological Complexity 44, Art. 100885, 8 pp (2020).
- [3] Mahrouf, M, Boukhouima, A, Zine, H, Lotfi, EM, Torres, DFM, Yousfi, N, Modeling and forecasting of COVID-19 spreading by delayed stochastic differential equations, Axioms 10(1), Art. 18, 16 pp (2021).
- [4] Ndaïrou, F, Area, I, Bader, G, Nieto, JJ, Torres, DFM, Corrigendum to "Mathematical modeling of COVID-19 transmission dynamics with a case study of Wuhan" [Chaos Solitons Fractals 135 (2020), 109846], Chaos Solitons Fractals 141, Art. 110311, 6 pp (2020)

- [5] NDAÏROU, F, AREA, I, NIETO, JJ, SILVA, CJ, TORRES, DFM, Fractional model of COVID-19 applied to Galicia, Spain and Portugal, Chaos Solitons Fractals 144, Art. 110652, 7 pp (2021)
- [6] NDAÏROU, F, AREA, I, NIETO, JJ, TORRES, DFM, Mathematical modeling of COVID-19 transmission dynamics with a case study of Wuhan, Chaos Solitons Fractals 135, Art. 109846, 6 pp (2020)
- [7] SILVA, CJ, CANTIN, G, CRUZ, C, FONSECA-PINTO, R, PASSADOURO DA FONSECA, R, SOARES DOS SANTOS, E, TORRES, DFM, Complex network model for COVID-19: human behavior, pseudo-periodic solutions and multiple epidemic waves, J. Math. Anal. Appl., in press. DOI: 10.1016/j.jmaa.2021.125171
- [8] SILVA, CJ, CRUZ, C, TORRES, DFM, MUÑUZURI, AP, CARBALLOSA, A, AREA, I, NIETO, JJ, FONSECA-PINTO, R, PASSADOURO DA FONSECA, R, SOARES DOS SANTOS, E, ABREU, W, MIRA, J, Optimal control of the COVID-19 pandemic: controlled sanitary deconfinement in Portugal, Scientific Reports 11, Art. 3451, 15 pp (2021).
- [9] ZINE, H., BOUKHOUIMA, A., LOTFI, E.M., MAHROUF, M., TORRES, D. F. M., YOUSFI, N., A stochastic time-delayed model for the effectiveness of Moroccan COVID-19 deconfinement strategy, Math. Model. Nat. Phenom. 15 (2020), Art. 50, 14 pp.
- [10] ZINE, H, LOTFI, EM, MAHROUF, M, BOUKHOUIMA, A, AQACHMAR, Y, HATTAF, K, TORRES, DFM, YOUSFI, N, Modeling the spread of COVID-19 pandemic in Morocco. In Analysis of Infectious Disease Problems (COVID-19) and Their Global Impact, Springer Nature Singapore Pte Ltd, in press.