

The value of using a multi-group SIR model to simulate Covid-19 propagation, using fuzzy inference

Woody MERAT, LAMIA - Pointe-à-Pitre **S. REGIS**, LAMIA - Pointe-à-Pitre
S. P. NUIRO, LAMIA - Pointe-à-Pitre **W. MERAT**, LAMIA - Pointe-à-Pitre
A. DONCESCU, LAMIA - Pointe-à-Pitre

In general, simulation in the health domain offers different institutions the possibility to prevent and manage certain health crises. It is in this context that by using fuzzy subsets and aggregation operators to take into account the increase of risks related to age and obesity within the different age classes of the population, we propose a multi-group SIR model to simulate the spread of COVID-19 in an insular context. The objective is to emphasize the notion of hospitalization which was the major issue of this pandemic by replacing the R (Withdrawal) compartment by the H (Hospitalization) compartment [1, 2, 3, 4].

Keywords : COVID-19 simulation ; SIR ; fuzzy subsets ; multigroup ; aggregation operators.

References

- [1] Sébastien Regis, Silvere P Nuiro, Woody Merat, and Andrei Doncescu. A data-based approach using a multi-group sir model with fuzzy subsets : application to the covid-19 simulation in the islands of guadeloupe. *Biology*, 10(10) :991, 2021.
- [2] Pierre Magal, Ousmane Seydi, and Glenn Webb. Final size of a multi-group sir epidemic model : Irreducible and non-irreducible modes of transmission. *Mathematical biosciences*, 301 :59–67, 2018.
- [3] Didier Dubois and Henri Prade. On the use of aggregation operations in information fusion processes. *Fuzzy sets and systems*, 142(1) :143–161, 2004.
- [4] Richard Emilion, Sébastien Regis, and Andrei Doncescu. A general version of the triple π operator. *International journal of intelligent systems*, 28(10) :957–973, 2013.