Fractional models in Biology

Anna Szafrańska[1] **Jacky Cresson**[2]

SUMMARY

Modelling of natural phenomena like e.g. spread of the virus or interactions between species, using mathematical tools is highly desirable due to the possibility of understanding and analysing the problem. A well-constructed model can be used to observe and predict the dynamics of a given phenomenon. The usual tools based on ordinary or partial differential equations in some cases can be insufficient to capture well the dynamic behaviour, especially in the modelling phenomena where we are dealing with the memory effect. To deal with this problem we can successfully reach for the fractional calculus and take advantage of the non-locality property of the fractional order derivatives.

In this talk we give some examples of superiority of mathematical modelling using fractional calculus over the classical approach. Mostly we focus on the modelling problem of the spread of the dengue fever epidemic, i.e. fractional model construction, numerical approach for model validation, parameters estimation.

Keywords: Fractional calculus, Non-standard numerical methods, Parameter estimation

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[1]Gdansk University of Technology, Poland
 email: `annszafr@pg.edu.pl`

[2]University of Pau and Pays de l'Adour
 email: `jacky.cresson@univ-pau.fr`