# From individual-based modelling to partial differential equations. An application to the glass-eel motion inside the 'Adour' river

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The main goal of the work is to justify a certain individual-based model by deriving the corresponding PDE for it.

Individual-Based Modelling has become a used technique in Mathematical Biology, because many papers deal with computer simulations characterized by a high number of individuals (agents) acting inside with some relations between them. The aim of these simulations is to study the global behaviour of the population which emerges from microdynamical properties of these agents.

However, most of these simulations involve some kind of stochasticity, characterized by the set of random choices individuals make during the simulation. We are not sure whether the results we obtain (in one realization) are an adequate representation of reality, because we have a tiny sample size compared to the huge amount of possible realizations.

This topic has been avoided by scientists who feel satisfied with a 'good global behaviour' of the model in terms of qualitative features, but an answer is still needed in order to justify the validity of these simulations and extract as many conclusions as possible from their results.

The intention of the work is answering this question for a particular IBM. Our IBM describes the motion of glass-eels inside the 'Adour' river (France). We obtain a PDE for the density of eels from the Stochastic Differential Equations used in the IBM.

## References

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