Modeling from organs to herd and resource allocation

ECTS

4

Mots clés

Elevage, Modeling, Animal, Métabolisme, Meta-analysis, Méta-analyse, Husbandry, Lactation, Systémique, Modélisation, Reproduction, Pet, Digestion, Systemics, Metabolism

Description du contenu de l'enseignement

Objectifs:
The goal is to provide students with a good command of modeling applied to biological functions in animals, which will be considered at different levels of organization.
Contenu :
* Basic knowledge on specific biological functions with a focus on lactation and reproduction.
* Expression of these functions from molecular level to the level of the herd.
* Comparison and specificity of production animals vs pets (physiology and physiopathology)
* Main concepts of systemic applied to living dynamic systems.
* Modeling methodology: knowledge representation tools, case object modeling, discrete events based models, ordinary differential equations.
* Genetic and phenotypic data processing, meta-analysis and methodology in relation with model parameterization and calibration.

Compétences à acquérir

Compétences:
- To integrate the complexity of animal systems at different levels of organization.
- To conceptualize animal as a regulated system with trade-offs and emerging properties, such as robustness and adaptive ability
- To be able to apply these concepts to different biological functions and to formulate them in mathematical terms
- To select appropriate modeling process and formalism according to biological questions and levels of organization
- To simulate and predict the behavior of a biological system
- To be able to process statistical analysis of datasets (meta-analysis).

To integrate the complexity of animal systems at different levels of organization thanks to modeling methodology.

Modalités d'organisation et de suivi

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Langue

Anglais

Volume horaire

CM : 44h, TD : 22h

Bibliographie, lectures recommandées

Alon (2007). An Introduction to system biology. Chapman and Hall/ CRC. Taylor and Francis Group, London

Période et lieu(x) enseignements

Période:
September-December
Lieu :
Paris

Mode de contrôle des connaissances

Personal work, assignments