



Università
Ca'Foscari
Venezia

TITOLO PROGETTO:

MATHEMACS— MATHEmatics of Multi-level Anticipatory Complex Systems

PROGRAMMA DI FINANZIAMENTO: 7 FP – COOPERATION > FP7-ICT-2011-8

RESPONSABILE SCIENTIFICO : Prof. Massimo Warglien

STRUTTURA (Dipartimento/Centro) : DIPARTIMENTO DI MANAGEMENT

DATI FINANZIARI:

Costo Complessivo del Progetto	Contributo Europeo Assegnato
€ 3 335 758	€ 2 552 916

SINTESI PROGETTO:

The MATHEMACS project aims to develop a mathematical theory of complex multi-level systems and their dynamics. In addition to considering systems with respect to a given level structure, as is natural in certain applications or dictated by available data, the project has the unique goal of identifying additional meaningful levels for understanding multi-level systems. This is done through a general formulation based on the mathematical tools of information and dynamical systems theories. To ensure that the theoretical framework is at the same time practically applicable, three key application areas are represented within the project, namely neurobiology, human communication, and economics. These areas not only provide us with some of the best-known epitomes of complex multi-level systems, but also constitute a challenging test bed for validating the generality of the theory since they span a vast range of spatial and temporal scales. Furthermore, they have an important common aspect; namely, their complexity and self-organizational character is partly due to the anticipatory and predictive actions of their constituent units. The MATHEMACS project contends that the concepts of anticipation and prediction are particularly relevant for multi-level systems since they often involve different levels. Thus, as a further unique feature, the project includes the mathematical representation and modelling of anticipation in its agenda for understanding complex multi-level systems. For validating the theory on large heterogeneous data sets, the project has a specific component with exclusive access to a wide range of data from human movement patterns to complex urban environments. In this way, MATHEMACS provides a complete and well-rounded approach to lay the foundations of a mathematical theory of the dynamics of complex multi-level systems.

Inizio Attività (previsione)	Fine Attività (previsione)
01/10/2012	30/09/2015

PARTENARIATO

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