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   Titolo   A Numerical Tool for the Analysis of Bioinspired Aquatic Locomotion / /
                        by Giovanni Bianchi

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   Descrizione fisica   1 online resource (84 pages)

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   Disciplina   623.827

   Soggetti   Bionics
                        Biomedical engineering
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   Lingua di pubblicazione   Inglese

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   Nota di contenuto   Introduction and state of the art -- Hydrodynamics of swimming --
                        Model of cownose ray locomotion -- Wake structure and swimming
                        performance of the cownose ray.

   Sommario/riassunto   This book presents a novel method for the numerical simulation of
                        swimming animals. It includes a review of the hydrodynamics of
                        swimming, a description of the CFD model adopted, and a description
                        of the results obtained by applying this model to the cownose ray. This
                        method is developed for the open-source software OpenFOAM and
                        relies on an overset mesh. A custom library is added to the solver to
                        include the equations of the kinematics of the animal under
                        investigation, combining the deformation of the fish fins with the
                        computed displacement and rotation of the animal's body. The
                        presented method helps investigate the dynamics of any animal moving
                        in a fluid, provided that its kinematics is known, and in this work, it is

applied to investigate the hydrodynamics of a cownose ray. This book is intended for researchers and engineers who aim to deeply understand the hydrodynamics of fish swimming and to design bioinspired autonomous underwater vehicles or novel propulsion systems.