

NUMERICAL COMPUTATIONS FOR RENEWABLE ENERGY

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ABSTRACT

Renewable Energy is a promising way to reduce the carbon emissions due to fossil energies. The first implementation of a renewable energy system was in 1966 in France with the La Rance dam that converts the variation in water level into electricity, and which is currently still operating. Many systems have been subsequently developed to convert solar, wind, current, waves energy in electric one. For example, the first offshore wind farm was installed in North Sea in 1991 by Danish colleagues to transform the wind power. As converters and their implementations are very expensive, numerical simulations become necessary steps for their design and the estimation of their expected lifetime. Many computational codes are considered for this purpose, based on various mathematical approaches such as classical CFD (Computational Fluid Method), which rely on finite-difference/finite-volume and finite-element methods, LBM (Lattice Boltzmann Method), Vortex method, SPH (Smooth Particle Hydrodynamics), BEM (Boundary Element Method), actuator methods including ADM (Actuator Disk Method) or ALM (Actuator Line Method). All contributions related to these methods are encouraged, and especially from students and young scientists.