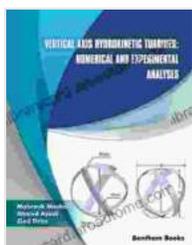


Vertical Axis Hydrokinetic Turbines: Numerical and Experimental Analyses

Vertical axis hydrokinetic turbines (VAHKTs) are a promising technology for harnessing energy from water currents. Their unique design, featuring blades that rotate around a vertical axis, offers several advantages over traditional horizontal axis turbines, including lower noise and vibration, higher efficiency at low flow speeds, and reduced environmental impact.



Vertical Axis Hydrokinetic Turbines: Numerical and Experimental Analyses by Ronald Pilchik

★★★★☆ 4.6 out of 5

Language : English
File size : 9569 KB
Text-to-Speech : Enabled
Enhanced typesetting : Enabled
Word Wise : Enabled
Print length : 205 pages
Lending : Enabled
Screen Reader : Supported



This book provides a comprehensive analysis of VAHKTs, covering their design, operation, and performance. It presents both numerical and experimental results, offering a thorough understanding of the factors that influence turbine performance and providing guidance for the design and optimization of future VAHKT systems.

Numerical Analysis

Numerical analysis is a powerful tool for investigating the behavior of VAHKTs. Computational fluid dynamics (CFD) simulations can provide detailed insights into the flow field around the turbine, allowing engineers to evaluate turbine performance and identify areas for improvement.

This book presents a detailed CFD analysis of a VAHKT, comparing the results with experimental data to validate the numerical model. The analysis investigates the effects of various design parameters, such as blade shape, number of blades, and tip speed ratio, on turbine performance.

Experimental Analysis

Experimental analysis is essential for validating numerical models and providing real-world data on the performance of VAHKTs. This book presents the results of extensive experimental testing of a VAHKT in a controlled environment.

The experimental setup includes a water tank, a VAHKT prototype, and a data acquisition system. The turbine performance is measured over a range of flow speeds and load conditions, providing valuable data for model validation and turbine optimization.

Design and Optimization

The numerical and experimental analyses presented in this book provide valuable insights for the design and optimization of VAHKTs. The book presents a systematic approach to turbine design, considering factors such as blade shape, number of blades, tip speed ratio, and operating conditions.

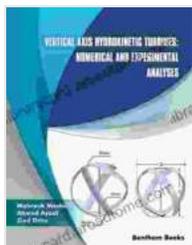
The book also explores advanced design concepts, such as variable-pitch blades and active flow control, which can further improve turbine performance.

Applications

VAHKTs have a wide range of potential applications, including providing clean and renewable energy for remote communities, powering offshore structures, and generating electricity from tidal currents. This book discusses the various applications of VAHKTs, providing insights into their potential and challenges.

This book provides a comprehensive analysis of vertical axis hydrokinetic turbines, covering their design, operation, and performance. It presents both numerical and experimental results, offering a thorough understanding of the factors that influence turbine performance and providing guidance for the design and optimization of future VAHKT systems.

Whether you are a researcher, engineer, or practitioner in the field of renewable energy, this book is an indispensable resource that will help you to advance the development and application of vertical axis hydrokinetic turbines.



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