COLLEGE OF ENGINEERING AND COMPUTER SCIENCE
FLORIDA ATLANTIC UNIVERSITY

Announces the Ph.D. Dissertation Defense of

Hugo Pimentel

for the degree of Doctor of Philosophy (Ph.D.)

"Modeling, Implementation and Control of a CVT Based PTO for a Small Scale MHK-Turbine in Low Flow Speed Current"

March 25, 2024, 2 p.m.
Engineering West, Room 187
777 Glades Road
Boca Raton, FL

DEPARTMENT:
Ocean and Mechanical Engineering

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ABSTRACT OF DISSERTATION
Modeling, Implementation and Control of a CVT Based PTO for a Small Scale MHK-Turbine in Low Flow Speed Operation
Modeling, simulation, bench and field testing of a power takeoff (PTO) equipped with a continuously-variable transmission (CVT) for a small marine hydrokinetic (MHK) undershot waterwheel (USWW) deployed from a floating platform is described. The objective is to develop and control a PTO for the optimal conversion of the flow energy to electric power, charging batteries onboard the platform. This work shows the feasibility of utilizing the CVT's variable gear ratio to maintain the turbine's optimal tip speed ratio (TSR) and vary the generator speed, increasing the efficiency of the PTO. The concept was successfully demonstrated, with the system satisfactorily capturing and converting water flow energy into electricity.

BIOGRAPHICAL SKETCH
Recife, Brazil
B.S., Universidade Federal de Pernambuco, Recife, Brazil, 2016
M.S., Oakland University, Rochester Hills, Michigan, 2018
Ph.D., Florida Atlantic University, Boca Raton, Florida, 2024

CONCERNING PERIOD OF PREPARATION
& QUALIFYING EXAMINATION

Time in Preparation: 2022 - 2022

Qualifying Examination Passed: Fall 2022

Published Papers:

H. Pimentel, A. McKinney, E. Henderson, J. Frankenfield, P. -P. Beaujean and M. Dhanak, "A Power Takeoff Device for a Small Marine Hydrokinetic Turbine Deployed from an Unmanned Floating Platform," OCEANS 2023 - MTS/IEEE U.S. Gulf Coast, Biloxi, MS, USA, 2023, pp. 1-6, doi: 10.23919/OCEANS52994.2023.10337094.

A. McKinney et al., "A Low-Flow Marine Hydrokinetic Turbine for a Floating Unmanned Mobile Platform," OCEANS 2022, Hampton Roads, Hampton Roads, VA, USA, 2022, pp. 1-6, doi: 10.1109/OCEANS47191.2022.9977141

M. Dhanak, "Development of an Unmanned Mobile Current Turbine Platform", Proc. EWTEC, vol. 15, Sep. 2023.

McKinney, Adriana Lynell, Rienzo, Hayley, Pimentel, Hugo, Frankenfield, John, Beaujean, Pierre-Phillip, and Manhar Dhanak. "Site Selection for Field Testing of a Marine Hydrokinetic Turbine Platform to Serve as a Floating Unmanned Mobile Recharging Station for Aerial Drones." Paper presented at the Offshore Technology Conference, Houston, Texas, USA, May 2023. doi: https://doi.org/10.4043/32349-MS