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89c89
< The paper presents a performance analysis of the MBARI wave-energy converter, designed for o
ceanographic applications to generate 300-500 W of electrical power on average. The prototype
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99c99
< the data acquired in the MBARI buoy field testing. The proposed causal latching control sche
mes have been shown to be
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> the data acquired in the field testing. The proposed causal latching control schemes have be
en shown to be
105c105,109
< MBARI has been developing a wave-energy conversion buoy specifically for powering oceanograp
hic instrumentation. The resulting device is a  two-body point absorber in which a power take-
off device connects a surface buoy and a submerged anti-heave plate (see figure \ref{fig:MBARI
_WEC}).  The relatively low average power level requirements (300-500\,W) and small size make
this system distinct from the larger wave-energy conversion devices currently being explored f
or utility power applications.  Nevertheless, it is still important to develop as much power a
s possible from these systems with respect to their size and weight.  The work presented here
is the result of a collaboration between MBARI and IDMEC-IST intended to utilize the computati
onal tools present at \mbox{IDMEC}-IST to explore advanced control schemes (latching in partic
ular) to increase the amount of power captured by the MBARI system.  Up to the point of this w
ork, the MBARI system had been deployed only with a linear damping scheme in which the power t
ake-off machinery exerts a force that is proportional to the relative speed between the surfac
e buoy and submerged plate.
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> The Monterey Bay Aquarium Research Institute (MBARI) has been developing a wave-energy conve
rsion buoy specifically for powering oceanographic instrumentation. The resulting device is a
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ged anti-heave plate (see figure \ref{fig:MBARI_WEC}).  The relatively low average power level
 requirements (300-500\,W) and small size make this system distinct from the larger wave-energ
y conversion devices currently being explored for utility power applications.
>
> The future holds many ambitious projects for oceanographic data-acquisition systems. At-sea
charging stations for autonomous underwater vehicles (AUVs) and autonomous un-moored platforms
 for extended deployments are examples of such projects that are underway and that we will lik
ely see come to fruition in the coming years. The development of energy harvesting techniques
for these systems is important and we aim to advance those efforts.  In spite of the relativel
y small absolute energy levels this sort of system operates at, it is still important to devel
op as much power as possible from these systems with respect to their size and weight and the
study presented here explores optimization techniques for that reason.
>
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cheme in which the power take-off machinery exerts a force that is proportional to the relativ
e speed between the surface buoy and submerged plate.
140c144
< The wave-energy conversion device considered here (see figure \ref{fig:MBARI_WEC}) consists
of a cylindrical surface buoy connected to a submerged plate, 30\,m below the surface, by an e
lectro-hydraulic power take-off system.
---
> The wave-energy conversion device considered here (see figure \ref{fig:MBARI_WEC}) consists
of a cylindrical surface buoy connected to a submerged plate, 30\,m below the surface, by an e
lectro-hydraulic power take-off system (PTO).
158c162
<   \item  mass: $m_3 = 972$\,kg;
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>   \item  mass: $m_3 = 970$\,kg;
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177c181
<         \item absolute pressure: 5.17\,bar;
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>         \item absolute pressure: 5.2\,bar;
182c186
<         \item absolute pressure: 8.69\,bar;
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>         \item absolute pressure: 8.7\,bar;
193c197
<   \item  6 DOF GPS aided IMU to measure the buoy motions and location;
---
>   \item  6 degree-of-freedom GPS aided inertial measurement unit to measure the buoy motions
 and location;
470c474
< \caption{Mean power conversion, $P_\text{mean}$, as function of $\lambda$ and $C_\text{sys}$
, for each of the May spectra.}
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> \caption{Mean power conversion, $P_\text{mean}$, as function of $\lambda$ and $C_\text{sys}$
, for each of the May spectra.  There is no field test result for (f) because waves in this he
ight range did not occur during the deployment period.}
648c652
< The future holds many ambitious projects for oceanographic data-acquisition systems. At-sea
charging stations for autonomous underwater vehicles (AUVs) and autonomous un-moored platforms
 for extended deployments are examples of such projects that are underway and that we will lik
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for these systems is important and we aim to advance those efforts.  In particular, this work
has illustrated that for small wave-energy harvesting systems of this type, the most expedient
 way to increase the power capture is to increase the size, mass, and drag of the submerged el
ement of the system and utilize simple linear-damping power take-off devices.  The limits to t
his approach become the large peak loads that result and the implications for storm survivabil
ity.  The natural development path is towards compliant sub-surface heave plates that can exer
t large inertial and drag forces in moderate sea states but that can shed power in larger sea
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