1. Exciting force/torque due to diffraction:

From the linearized Bernoulli’s equation, with is the fluid density:

On the other hand, the generalized hydrodynamic forces, , on the body in the direction (:

Substitutes Equation (60) into (61) to get:

The OSWEC only has motions in pitch DOF. This leads to:

From this, exciting force/torque to due diffraction can be written respectively as followings:

1. For pitch DOF, the torque equation can be rewritten in elliptical coordinates as

*Note:*

* : torque taken at the mounting point between the flap and the foundation.
* Only fundamental mode exists in diffraction problem. All other modes vanish.

With

With

The results are the same as shown in Michele *et al.* (2012)’s paper (Equation 4.2). *Note*, Michele’s paper only considers bottom-fixed device, the equation for here is modified to consider the case in which the bottom is raised distance from the floor.

1. For surge DOF, similarly, the force equation is expressed in elliptical coordinates as

With

1. Added inertia coefficient due to radiation:
2. Pitch-pitch

With

Again, same expression is shown in Michele *et al.* (2012)’s paper (Equation 4.3)

1. Surge-pitch

With

1. Radiation damping
2. Pitch-pitch
3. Surge-pitch