## Model Name

Observer

## Revision History

|  |  |  |  |
| --- | --- | --- | --- |
| Version | Date | Author | Changes Made |
| 1 | 2014/06/20 | Torstein Ingebrigtsen Bø | Initial |
|  |  |  |  |

## Model Hierarchy

## Description

The task for the observer is to give a good estimate of the position and velocity, based on measurements. It should also filter out the zero mean disturbances in position and velocity due to first order wave forces.

### Implementation details

This is an implementation of Fossens passive observer see Fossen 2011 for details.

## Parameters (include parameter identification)

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Dimension | Unit | Description |
| M | 3x3 | [kg kg kgm2] | Mass matrix, added mass + rigid body mass |
| D | 3x3 | [Ns/m Ns/m Nms/rad] | Linear damping matrix |
| Observer.K1  Observer.K2  Observer.K3  Observer.K4  Observer.Aw  Observer.Cw |  |  | Observer parameters see Fossen 2011 |
| Thrust0 | 3x1 | [N N Nm] | Initial bias force in NED |

## Input

### Ports

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ID | Name | Dimension | Unit | Description |
| 1 | nu | 3x1 | [m/s m/s rad/s] | Measured velocity in BODY: surge, sway, yaw |

## Output

### Ports

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ID | Name | Dimension | Unit | Description |
| 1 | eta\_hat | 3x1 | [m m rad] | Estimated position of vessel: North, East, heading. |
| 2 | deta\_hat | 3x1 | [m/s m/s rad/s] | Estimated velocity of vessel in NED: North, East, heading. |

### Goto

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Dimension | Unit | Description |
| y | 3x1 | [m m rad] | Measured position of vessel: north, east, heading |

## Limitation (include some comments of possibility to increase/decrease fidelity)

Observer can be extended to adaptive passive observer.

## Validation

## Comments

## Reference

Fossen, Thor I. 2011. *Handbook of Marine Craft Hydrodynamics and Motion Control*. *Handbook of Marine Craft Hydrodynamics and Motion Control*. John Wiley and Sons.