# System description

content

[System description 1](#_Toc53562025)

[1. Flowchart 2](#_Toc53562026)

[Unique identifiers 2](#_Toc53562027)

[2. Table of limits 2](#_Toc53562028)

[3. Table of properties 3](#_Toc53562029)

[Reference 4](#_Toc53562030)

# Flowchart

图片包含 图形用户界面

描述已自动生成

## Unique identifiers

|  |  |
| --- | --- |
| Unique ID | Long Name |
| U1 | User input |
| U2 | Simulation output |
| O1 | Impact to environment |
| O2 | Impact from environment |

# Table of limits

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Interaction | Symbol | Min. | Max. | Unit |
| -> U1 | | | | |
| User input |  |  |  |  |
| Boat speed |  | 0 | 8.3 | m/s |
| -> U2 |  |  |  |  |
| Simulation output |  |  |  |  |
| Thrust |  | 0 | 500 | N |
| Boat velocity |  | 0 | 10 | m/s |
| Power input |  | 0 | 6000 | W |
| Power output |  | 0 | 4100 | W |
| Power loss |  | 0 | 810 | W |
| Efficiency |  | 0 | 100 | % |
| Prompts for successful simulation | - | Simulate successfully | | - |
| Warnings for unsuccessful simulation | - | Simulate unsuccessfully | | - |
| Prompts for how to optimize unsuccessful simulation | *-* | Input error. Input values should be numeric. | | - |
| -> O1 |  |  |  |  |
| Impact to the environment |  |  |  |  |
| Heat |  | Will not be considered in the design | | W |
| Noise |  | dB |
| -> O2 |  |  |  |  |
| Impact from environment |  |  |  |  |
| Temperature |  | Will not be considered in the design | |  |
| Humidity |  | %RH |

# Table of properties

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Generator | Symbol | Min. | | Max. | Unit |
| User interactions | | | | | |
| Motor subsystem | | | | | |
| Motor properties | *Will not be considered in the design.* | | | | |
| Motor data array(U-I) | - | | - | - | V/A |
| Motor data array(I-T) | - | | - | - | A/T |
| Motor data array(U-E) |  | | - | - | U/- |
| Shaft subsystem | | | | | |
| Shaft density (Exhibition, 2019) | *Will not be considered in the design.* | | | | |
| Diameter |
| Length |
| Shaft torsional stiffness |
| Bearing subsystem | | | | | |
| Type | *Will not be considered in the design.* | | | | |
| Inner diameter |
| Outer diameter |
| Friction |
| Friction coefficient (Bearing friction coefficient, 2018) |  |  | |  | - |
| Gearing subsystem | | | | | |
| Gear material hardness (Hardness of general gears, 2017) | *Will not be considered in the design.* | | | | |
| Diameter |
| Tooth shape |
| Friction coefficient |  | *0.1* | | *0.15* | - |
| Ratio |  | 0,1 | | 10 | # |
| Index circle pressure angle |  | 15 | | 25 |  |
| Index circle diameter of driving wheel |  | 0 | | - | m |
| Addendum radius |  | 0 | | - | m |
| Deddendum radius |  | 0 | | - | m |
| Lubricant viscosity (Viscosity index) |  | 0 | | - | - |
| Tooth number (Standard gear tooth number, 2019) |  | 0 | | - | - |
| Modulus |  | 0 | | - | - |
| Lubricant density |  | 0 | | - |  |
| Immersion depth |  | 0 | | R | m |
| Tooth width |  | 0 | | R | m |
| Propeller subsystem |  |  | |  |  |
| Blade count | - | 2 | | 6 | # |
| Diameter |  | 0,1 | | 0,5 | m |
| Torque |  | 5 | | 30 | Nm |
| Blade surface area | *Will not be considered in the design.* | | | | |
| Blade coefficient |  | 0 | | 1,2 | - |
| Blade pitch (Blade pitch) | - | 35 | | 39 | ° |
| Propeller coefficient (Dalian Maritime University, 2018) |  | 0 | | 0,4 |  |
| J | 0 | | 0,9 |  |
| User interface subsystem | | | | | |
| User interface properties | *Will not be considered in the design.* | | | | |
| Environmental impacts |  |  | |  |  |
| Air thermal coefficient | *Will not be considered in the design.* | | | | |
| Airpressure |
| Heat |
| Noise |
| Temperature |
| Humidity |

# Reference

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