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Effect of propeller modelling on station- keeping thruster allocation strategy

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In preliminary Dynamic Positioning calculations, quasi-steady prediction approach is commonly used to figure out the system capability. Thrust allocation solver is usually modelling the thruster devices as pure force generators, considering empirical general formulations to correlate delivered thrust with absorbed power. In such a way,a rough estimate of the power demand during station-keeping operations can be made. Once allocation algorithm is using minimum power demand as objective function, then a more precise modelling of the thrusters can be helpful since preliminary design stages. In the specific, by using an allocation algorithm capable to manage nonlinear objective function and constraints, several types of propellers can be modelled, considering differences between tunnel thrusters and azimuthal thrusters, or the differences between fixed pitch and controllable pitch propellers. An example of the effect of propeller modelling is given, considering an Offshore Supply Vessel mounting steerable thrusters equipped with controllable pitch propellers, highlighting the differences with a standard allocation approach.

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