Nomenclature

* 6-DOF: six degrees of freedom, full attitude and position states
* UAV: unmanned aerial vehicle, any autonomous aircraft
* SISO: single-input single-output typical control loop, mostly in frequency domain
* MEMs: Mico-electromechanical systems; accelerometers, gyroscopes and the like
* DIY: Do-it-yourself, incontext example hobbyking SK450 kit
* VTOL: vertical take-off/landing aircraft, EG helicopter, osprey, quadrotor, bi-rotor
* 3-D: three dimensional vector with components in cartesian X-Y-Z axial directions
* MPC: model predictive control
* QFT: quantative feedback technology
* IMU: inertial measurement unit, either 6-DOF acc/gyro or 9-DOF acc/gyro/mag
* RPM: revolution per minute, typical units for propeller rotational velocity
* BLDC: Brushhless-DC motor, actually 3-phase with ESC operates like DC motor
* KV: Thousand RPM per V applied, rating unit for BLDC motor
* OAT: opposed active tilting, single axis rotation on bi-rotor
* dOAT: dual axis opposed active tilting
* PD: Controller structure proportional to error and error derivative
* PID: Proportional to error, error integral and error derivative
* PSO: Particle swarm optimization, gradient free optimization method
* ITAE: Integral-time absolute error, cost function used to evaluate setpoint tracking
* BEM: Blade-Element momentum theory, calculation of applied thrust from propeller
* LQR: linear quadratic regulator, control structure

Symbols

* Euler angle set
* pitch rotation about X axis, rad
* roll rotation about Y axis, rad
* yaw rotation about Z axis, rad
* transformed Euler angles in common shared body frame
* attitude quaternion with scalar and vector components
* angular velocity in body frame, rad/s
* inertial position, m
* translational velocity in body frame, m/s
* full 6-DOF state for combined attitude and position
* desired state setpoint
* error state, not necessarily subtractive, quaternion errors are multiplicative
* rotational velocity of ith propeller, RPM or RPS specified
* propeller thrust as a function or rotational speed, from EQ:, N
* motor module rotation about X axis, rad
* motor module rotation about Y axis, rad
* input torque, Nm
* attitude controller designed torque input, Nm
* input force, N
* position controller designed force input, N
* generalized virtual control input
* rotational inertia matrix, aligned with in Kgm^2
* vehicle mass, Kg
* actuator matrix
* body frame origin
* motor module center of rotation
* vector arm length from  origin, m
* body x center of mass
* body x mass
* body x rotational inertia
* for rotor body
* for inner ring assembly
* for middle ring assembly
* for net motor module
* for constant body frame
* for net multi-body assembly