# Notation

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Vectors and matrices are denoted as boldface symbols such as $\boldsymbol{x}$ and non-boldface symbols like $x$ will be used for scalars. Left subscripts indicate the coordinate system, for example ${}_I\boldsymbol{x}$ expresses the vector $\boldsymbol{x}$ in the inertial frame. In general, if no left subscript is used, then the vector is expressed in the body frame $B$. Square brackets is reserved for discrete variables, where the letter $k$ represents the discrete time index. Deviation variables are denoted with a small tilde such as $\tilde{x}$, nominal variables with a bar ($\bar{x}$), state estimates with a hat ($\hat{x}$) and time derivatives with a dot ($\dot{x}$). A vector element index is expressed as a right lower subscript. For instance, the first element of a vector $\boldsymbol{q}$ is expressed as a scalar variable $q_0$. If a specific element of a vector is meant, such as the x-component of $\boldsymbol{\omega}$, the variable is written as a scalar variable $\omega_x$. If a subscript contains a comma, then the expression after the comma describes the scalar variable in more detail. For instance, the desired angular velocity in the x-direction is denoted as $\omega_{x,des}$.

Exception of the previous mentioned notation applies to optimization variables, state matrices and weighting matrices, where the matrices are denoted as non-bold symbols to simplify notation. The optimization variables are also expressed as non-bold symbols with a lower subscript $k$ that denotes the discrete prediction time. In order to express a specific element of an optimization variable, parentheses are used. For instance, the first element of an optimization variable at the discrete prediction time 0 is expressed as $x_0(1)$, where indexing starts at 1.