MAE 511 Notation List

EMSSL

Below is a list of the basic notation for use with the MAE 511 course.

|  |  |  |
| --- | --- | --- |
| **Formula name** | **Formula** | **Example** |
| Angular momentum |  |  |
|  |  |  |
| Acceleration |  |  |
|  |  |  |
| Angular acceleration |  |  |
|  |  |  |
| Angular velocity |  |  |
|  |  |  |
| Cross product |  |  |
|  |  |  |
| Cross product expression |  |  |
|  |  |  |
| Derivative (first order) |  |  |
|  |  |  |
| Derivative (nth order) |  |  |
|  |  |  |
| Direction Cosine Matrix |  |  |
| **Formula name** | **Formula** | **Example** |
|  |  |  |
| External forces |  |  |
|  |  |  |
| Frame |  |  |
|  |  |  |
| Frame definition |  |  |
|  |  |  |
| Inertia tensor |  |  |
|  |  |  |
| Inertia tensor + frame |  |  |
|  |  |  |
| Inertia tensor expressed |  |  |
|  |  |  |
| Lagrangian |  |  |
|  |  |  |
| Offset fraction |  |  |
|  |  |  |
| Omega matrix |  |  |
|  |  |  |
| Partial derivative (first order) |  |  |
|  |  |  |
| Partial derivative (nth order) |  |  |
|  |  |  |
| **Formula name** | **Formula** | **Example** |
| Position vector |  |  |
|  |  |  |
| Quaternions |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
| Quaternion Rotation Matrix |  |  |
|  |  |  |
| Quaternion Definition |  |  |
|  |  |  |
| Vector expression (horizontal) |  |  |
|  |  |  |
| Vector expression (vertical) |  |  |
|  |  |  |
| Velocity vector |  |  |
|  |  |  |
| Quaternion Update Relationship |  |  |
|  |  |  |
|  |  |  |
| **Formula name** | **Formula** | **Example** |
|  |  |  |
| Quaternion Matrix |  |  |
|  |  |  |
| Rotation |  |  |
|  |  |  |
| Rotation matrix |  |  |
|  |  |  |
| Rotation matrix derivative |  |  |
|  |  |  |
| Rotation about x |  |  |
|  |  |  |
| Rotation about y |  |  |
|  |  |  |
| Rotation about z |  |  |
|  |  |  |
| Sum |  |  |
|  |  |  |
| Sum torques |  |  |
|  |  |  |
| Sum torques at a point |  |  |
| **Formula name** | **Formula** | **Example** |
| 1st derivative transport theorem |  |  |
|  |  |  |
| 2nd derivative transport theorem |  |  |
|  |  |  |
| Unit dyad |  |  |
|  |  |  |
| Unit vector |  |  |
|  |  |  |
| Upper right superscript |  |  |
|  |  |  |
| Omega x expression |  |  |
|  |  |  |
| Omega y expression |  |  |
| Omega z expression |  |  |