Method cheat sheet for class VortexSystem

|  |  |  |
| --- | --- | --- |
| What it does | Function | Jump to |
| Calculates the coordinates of the bound vortices of one blade and saves them to coordinates\_blade\_bound\_elementwise. It does that by purely rotating the given blade structure to the current “blade\_rotation”. | \_blade\_bound\_elementwise | <https://github.com/JonasMPN/LiftingLine/blob/master/src/vortex_system.py#L348> |
| Calculates the coordinates of the trailing vortices of one blade and saves them to coordinates\_blade\_trailing\_elementwise. It does that by calculating the first trailing vortex which is fixed to the blade. This vortex is parallel to the chord and goes from 1/4 chord to 5/4 chord. After that its helix geometry. | \_blade\_trailing\_elementwise | <https://github.com/JonasMPN/LiftingLine/blob/master/src/vortex_system.py#L361> |
| Combines elementwise coordinates into one numpy array. If the coordinates do not exist run the input function “if\_not\_do” (which should then calculate these coordinates). After that, continue with the combining. | \_combine\_elementwise | <https://github.com/JonasMPN/LiftingLine/blob/master/src/vortex_system.py#L434> |
| Rotates combined coordinates. If the coordinates do not exist run the input function “if\_not\_do” (which should then calculate these coordinates). After that, continue with the rotating. | \_rotate\_combined | <https://github.com/JonasMPN/LiftingLine/blob/master/src/vortex_system.py#L455> |
| Calculate the induced velocities at “control\_point” of a vortex with circulation=1 that spans from “vortex\_star”t to “vortex\_end”. | \_vortex\_induction\_factor | <https://github.com/JonasMPN/LiftingLine/blob/master/src/vortex_system.py#L485> |
| Build up a matrix that relates the induced velocities at a control point with all existing bound vortices. The nested loops are (1. outermost, 3. innermost):   1. Bound vortex systems of all blades 2. Control points 3. Bound vortices of the current bound vortex system | bound\_induction\_matrices | <https://github.com/JonasMPN/LiftingLine/blob/master/src/vortex_system.py#L185> |
| Build up a matrix that relates the induced velocities at a control point with all existing trailing vortices. The nested loops are (1. outermost, 4. innermost):   1. Trailing vortex system of all blades 2. Control points 3. Blade elements 4. Trailing vortices of the current blade element of the current trailing vortex system | trailing\_induction\_matrices | <https://github.com/JonasMPN/LiftingLine/blob/master/src/vortex_system.py#L217> |
| All other functions are either for error reporting, setting values of the class, plotting the vortex system, or changing the data format of method inputs. |  |  |