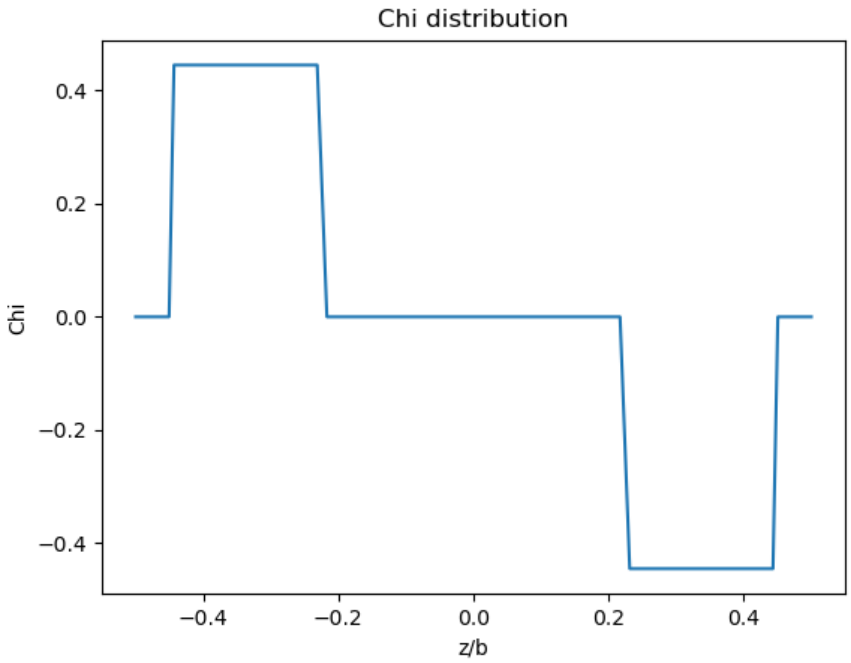
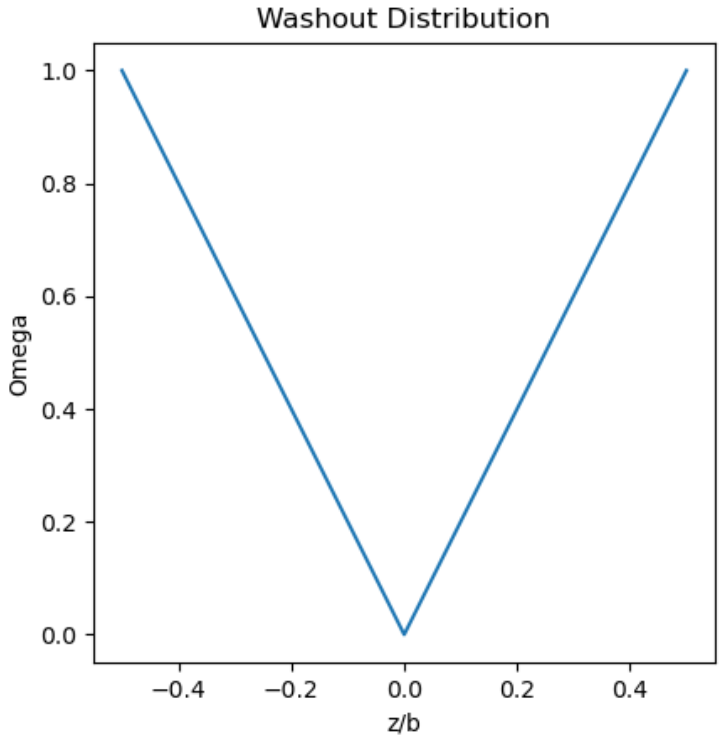
I used a json with the following inputs to provide the answers in this document.

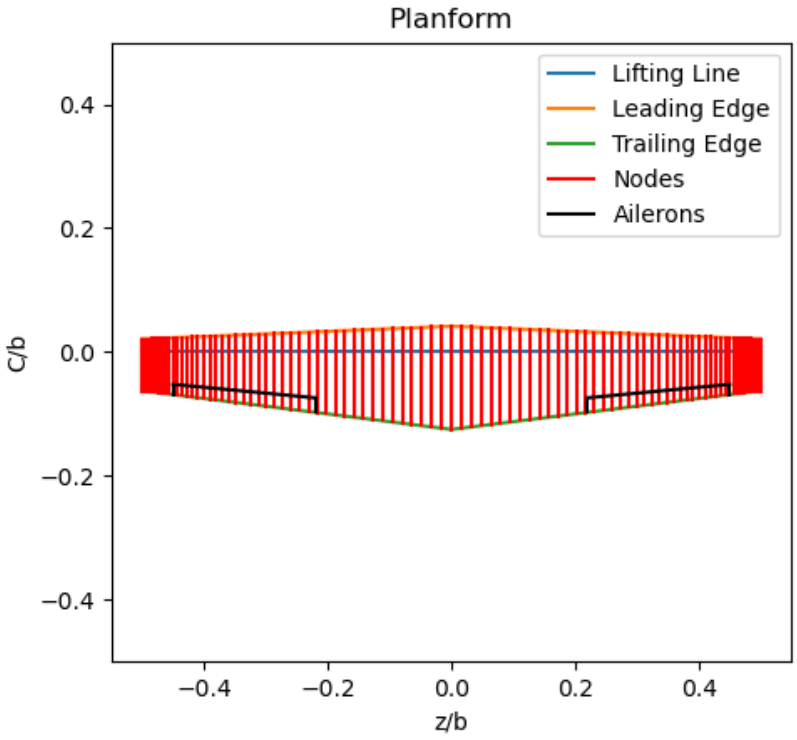
```
{
    "wing" : {
        "planform" : {
            "type" : "tapered",
            "planform_type_notes" : [["elliptic: (requires aspect_ratio)"],
                                     ["tapered: (requires aspect_ratio and
taper_ratio)"]],
            "aspect_ratio" : 8.0,
            "taper_ratio" : 0.5
    },
            "airfoil_lift_slope" : 6.283185307179590,
            "nodes_per_semispan" : 50,
            "washout" : {
                "distribution" : "linear",
                "xdistribution" : "none",
                "ydistribution" : "optimum",
                "distribution_options" : [["none: no twist"],
                                          ["linear: linear twist distribution"],
                                          ["optimum: optimum twist distribution"]],
                "amount[deg]" : 5.0,
                "xamount[deg]": "optimum",
                "amount_options" : [["value: real number in degrees"],
                                    ["optimum: requires CL_design"]],
                "CL_design" : 0.8
    },
        "aileron" : {
            "begin[z/b]" : 0.22,
            "end[z/b]" : 0.45,
            "begin[cf/c]" : 0.18,
            "end[cf/c]" : 0.18,
            "hinge_efficiency" : 0.85,
            "deflection_efficiency" : 1.0
        }
    },
    "condition" : {
        "alpha_root[deg]" : 5.0,
        "aileron_deflection[deg]" : 5.0,
        "pbar" : "steady",
        "xpbar": 5.0,
        "pbar_notes" : "value or 'steady'"
    },
    "view" : {
        "planform" : true,
```

```
        "washout_distribution" : true,
        "aileron_distribution" : true
        }
    }
```

Kappa_L	0.012589677684387466
Kappa_D	0.01718964716851748
C_L_alpha	4.964052425695759
e_s	0.983100843371374
epsilon_omega	0.43233940465998383
kappa_DL	0.04216737321076052
kappa_DOmega	0.12365125983027293
Cl_da	-0.24781885650645782
Cl_p_bar	-0.5437850722861051
pbar steady	-0.03976989453187295
Cl	0.00000000000000000
Cn	0.0008461964443348033
C_L	0.24590789925688128
CDi no aileron or roll	0.003191948095392272
CDi with aileron and roll	0.0034727609973381015




Washout Distribution
Omega
z/b
1.0
0.8
0.6
0.4
0.2
0.0
−0.4
−0.2
0.0
0.2
0.4


Planform
Lifting Line
Leading Edge
Trailing Edge
Nodes
Ailerons
C/b
z/b
0.4
0.2
0.0
−0.2
−0.4
−0.4
−0.2
0.0
0.2
0.4

The C and C inverse matrices along with a_n, b_n, c_n, d_n, and A_n can be found in the “solutions.txt” file attached to this submission.