%% Problem 3 No Wake Rotation

B= 3;

R = 10;

C\_L = 1;

lambda = 7;

alpha = 7;

r\_R = 0.1:0.1:1;

lambda\_r = lambda\*r\_R;

phi = atand(2./(3\*lambda\_r));

theta\_p = phi - alpha;

phi\_tip = atand(2./(3\*lambda));

theta\_t = phi - phi\_tip;

c = (8\*pi()\*r\_R.\*R.\*sind(phi))./(3\*B\*C\_L\*lambda\_r);

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| phi | 43.60282 | 25.46335 | 17.61258 | 13.3925 | 10.7843 | 9.019322 | 7.747772 | 6.788975 | 6.040565 | 5.440332 |
| Theta\_p | 36.60282 | 18.46335 | 10.61258 | 6.392498 | 3.784298 | 2.019322 | 0.747772 | -0.21103 | -0.95943 | -1.55967 |
| Theta\_T | 38.16249 | 20.02301 | 12.17225 | 7.952166 | 5.343966 | 3.57899 | 2.30744 | 1.348643 | 0.600233 | 0 |
| c | 2.751258 | 1.715144 | 1.207086 | 0.924009 | 0.746451 | 0.625397 | 0.53781 | 0.47159 | 0.419807 | 0.378224 |

%% Problem 4 No Wake Rotation

B= 3;

R = 20;

C\_L = 1;

lambda = 6.5;

alpha = 7;

r\_R = [0.05, 0.15, 0.25, 0.35, 0.45, 0.55, 0.65, 0.75, 0.85, 0.95, 1];

lambda\_r = lambda\*r\_R;

%% a). No Wake Rotation

phi = atand(2./(3.\*lambda\_r));

theta\_p = phi - alpha;

phi\_tip = atand(2./(3.\*lambda));

theta\_t = phi - phi\_tip;

c = (8\*pi().\*r\_R.\*R.\*sind(phi))./(3.\*B.\*C\_L.\*lambda\_r);

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| phi | 64.01 | 34.36 | 22.31 | 16.33 | 12.84 | 10.56 | 8.97 | 7.79 | 6.88 | 6.16 | 5.86 |
| Theta\_p | 57.01 | 27.36 | 15.31 | 9.33 | 5.84 | 3.56 | 1.97 | 0.79 | -0.12 | -0.84 | -1.14 |
| Theta\_T | 58.15 | 28.51 | 16.45 | 10.48 | 6.98 | 4.71 | 3.11 | 1.93 | 1.02 | 0.31 | 0.00 |
| c | 7.72 | 4.85 | 3.26 | 2.42 | 1.91 | 1.58 | 1.34 | 1.16 | 1.03 | 0.92 | 0.88 |

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|  |  |  |  |  |  |  |  |  |  |  |  |

%% b). Wake Rotation

phi = 2/3\*atand(1./lambda\_r);

theta\_p = phi - alpha;

phi\_tip = 2/3\*atand(1./lambda);

theta\_t = phi - phi\_tip;

c = (8\*pi().\*r\_R)./(B\*C\_L) .\* (1 - cosd(phi));

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| phi | 48.00 | 30.48 | 21.07 | 15.82 | 12.58 | 10.42 | 8.88 | 7.73 | 6.84 | 6.13 | 5.83 |
| Theta\_p | 41.00 | 23.48 | 14.07 | 8.82 | 5.58 | 3.42 | 1.88 | 0.73 | -0.16 | -0.87 | -1.17 |
| Theta\_T | 42.17 | 24.65 | 15.24 | 9.99 | 6.75 | 4.59 | 3.05 | 1.90 | 1.01 | 0.30 | 0.00 |
| c | 0.14 | 0.17 | 0.14 | 0.11 | 0.09 | 0.08 | 0.07 | 0.06 | 0.05 | 0.05 | 0.04 |