**Problem 1**

|  |  |
| --- | --- |
| α | cl |
| -10 | -1.09654 |
| -9 | -0.986888 |
| -8 | -0.877234 |
| -7 | -0.767579 |
| -6 | -0.657925 |
| -5 | -0.548271 |
| -4 | -0.438617 |
| -3 | -0.328963 |
| -2 | -0.219308 |
| -1 | -0.109654 |
| 0 | 0 |
| 1 | 0.109654 |
| 2 | 0.219308 |
| 3 | 0.328963 |
| 4 | 0.438617 |
| 5 | 0.548271 |
| 6 | 0.657925 |
| 7 | 0.767579 |
| 8 | 0.877234 |
| 9 | 0.986888 |
| 10 | 1.09654 |
| 11 | 1.2062 |
| 12 | 1.31585 |
| 13 | 1.17602 |
| 14 | 0.652458 |
| 15 | 0.128897 |
| 16 | -0.394663 |
| 17 | -0.918223 |
| 18 | -1.44178 |
| 19 | -1.96534 |
| 20 | -2.4889 |
| 21 | -3.01246 |
| 22 | -3.53602 |
| 23 | -4.05958 |
| 24 | -4.58314 |
| 25 | -5.1067 |

**Problem 2**

|  |  |  |
| --- | --- | --- |
| x | θp, α\*=7 | θp, α\*=9 |
| 0.22 | 19.775 | 17.775 |
| 0.26 | 16.1205 | 14.1205 |
| 0.3 | 13.306 | 11.306 |
| 0.34 | 11.0817 | 9.08167 |
| 0.38 | 9.28456 | 7.28456 |
| 0.42 | 7.80507 | 5.80507 |
| 0.46 | 6.56738 | 4.56738 |
| 0.5 | 5.5176 | 3.5176 |
| 0.54 | 4.61653 | 2.61653 |
| 0.58 | 3.83502 | 1.83502 |
| 0.62 | 3.15101 | 1.15101 |
| 0.66 | 2.54747 | 0.547471 |
| 0.7 | 2.01112 | 1.11E-02 |
| 0.74 | 1.53139 | -0.468606 |
| 0.78 | 1.09985 | -0.900154 |
| 0.82 | 0.709602 | -1.2904 |
| 0.86 | 0.355035 | -1.64496 |
| 0.9 | 3.15E-02 | -1.96851 |
| 0.94 | -0.264913 | -2.26491 |
| 0.98 | -0.53744 | -2.53744 |

**Problem 3**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| x | dtork, U=.05 | dtork, U=.09 | dtork, U=.15 | dtork, U=.2 |  | α, U=.05 | α, U=.09 | α, U=.15 | α, U=.2 |
| 0.22 | -3.03E-02 | 6.31E-03 | 5.99E-03 | -4.97E-02 |  | -6.96978 | 2.47567 | 14.5144 | 22.5018 |
| 0.26 | -3.16E-02 | 1.04E-02 | 1.51E-02 | -5.54E-02 |  | -5.32769 | 2.97444 | 13.8634 | 21.4509 |
| 0.3 | -3.08E-02 | 1.55E-02 | 2.79E-02 | -5.82E-02 |  | -3.84295 | 3.39451 | 13.261 | 20.3866 |
| 0.34 | -2.78E-02 | 2.18E-02 | 4.45E-02 | -5.81E-02 |  | -2.71517 | 3.7459 | 12.726 | 19.3861 |
| 0.38 | -2.28E-02 | 2.92E-02 | 5.56E-02 | -5.52E-02 |  | -1.78815 | 4.04095 | 12.258 | 18.476 |
| 0.42 | -1.58E-02 | 3.77E-02 | 6.49E-02 | -4.94E-02 |  | -1.0156 | 4.29058 | 11.8502 | 17.6602 |
| 0.46 | -6.79E-03 | 4.73E-02 | 7.48E-02 | -4.08E-02 |  | -0.36347 | 4.50364 | 11.4944 | 16.9329 |
| 0.5 | 4.26E-03 | 5.80E-02 | 8.53E-02 | -2.93E-02 |  | 0.193418 | 4.68713 | 11.1829 | 16.2854 |
| 0.54 | 1.73E-02 | 6.98E-02 | 9.65E-02 | -1.50E-02 |  | 0.673945 | 4.84649 | 10.9087 | 15.7081 |
| 0.58 | 3.24E-02 | 8.27E-02 | 0.108372 | 2.02E-03 |  | 1.09245 | 4.98601 | 10.6662 | 15.192 |
| 0.62 | 4.94E-02 | 9.67E-02 | 0.120856 | 2.19E-02 |  | 1.45998 | 5.10904 | 10.4505 | 14.729 |
| 0.66 | 6.84E-02 | 0.111804 | 0.133989 | 4.45E-02 |  | 1.78516 | 5.21827 | 10.2577 | 14.3122 |
| 0.7 | 8.94E-02 | 0.127988 | 0.147773 | 6.99E-02 |  | 2.0748 | 5.31583 | 10.0845 | 13.9355 |
| 0.74 | 0.112392 | 0.145267 | 0.162208 | 9.82E-02 |  | 2.33435 | 5.40347 | 9.9282 | 13.5937 |
| 0.78 | 0.137349 | 0.16364 | 0.177295 | 0.12914 |  | 2.56821 | 5.48258 | 9.78648 | 13.2826 |
| 0.82 | 0.164282 | 0.183107 | 0.193034 | 0.162905 |  | 2.77998 | 5.55435 | 9.65749 | 12.9984 |
| 0.86 | 0.19319 | 0.203667 | 0.209425 | 0.199445 |  | 2.97261 | 5.61973 | 9.53961 | 12.7378 |
| 0.9 | 0.22407 | 0.22532 | 0.22647 | 0.227434 |  | 3.14857 | 5.67952 | 9.43153 | 12.4982 |
| 0.94 | 0.256922 | 0.248067 | 0.244168 | 0.243236 |  | 3.30992 | 5.73441 | 9.33208 | 12.2773 |
| 0.98 | 0.291745 | 0.271906 | 0.262519 | 0.259526 |  | 3.45838 | 5.78497 | 9.2403 | 12.0729 |

**Problem 4**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| U | PR, U\*=.111,α=7 | PR, U\*=.111,α=9 | PR, U\*=.167,α=7 | PR, U\*=.167,α=9 |
| 0.025 | -5.45E-03 | 0.217987 | -0.632854 | -0.269998 |
| 0.05 | 0.289807 | 0.447627 | -0.33802 | -4.07E-02 |
| 0.075 | 0.582941 | 0.675621 | -4.56E-02 | 0.18678 |
| 0.1 | 0.873293 | 0.90145 | 0.243857 | 0.411889 |
| 0.125 | 1.16022 | 1.12462 | 0.529642 | 0.634166 |
| 0.15 | 1.41483 | 1.19577 | 0.811213 | 0.853166 |
| 0.175 | 1.37188 | 0.63453 | 1.08804 | 1.06847 |
| 0.2 | 0.788762 | -0.380109 | 1.35963 | 1.24213 |
| 0.225 | -0.402553 |  | 1.48736 | 0.945993 |
| 0.25 |  |  | 1.15578 | 2.53E-02 |
| 0.275 |  |  | 0.185961 | -0.916397 |
| 0.3 |  |  | -0.993478 |  |
|  |  |  |  |  |
| **Stall U/U\*** | 0.216553 | 0.190634 | 0.27896 | 0.250623 |
| **Stall U** | 0.024037383 | 0.021160374 | 0.04658632 | 0.04185404 |