

Construct a turbine blade profile and calculate its area using the following points:

Points on the pressure side

P	1	2	3	4	5	6
y	4.0276	4.127	3.650	2.717	1.452	-0.0232
z	0.3262	0.821	1.315	1.809	2.303	2.7976

Points on the suction side

S	1	2	3	4	5	6
y	4.2404	5.156	4.775	3.515	1.791	0.0207
z	0.0107	0.5972	1.183	1.770	2.356	2.9431

Connect the points on the pressure side and suction side using Spline (**20** points for each side). Construct the arcs at the leading and trailing edges using the equations shown below:

For the leading edge arc, use the following equation (**6** points):

$$z = 0.1970(1 - \cos \phi) \quad y = 4.1763 + 0.1970 \sin \phi \quad -131^\circ \leq \phi \leq 19^\circ$$

For the trailing edge arc, use the following equation (**6** points):

$$z = 2.9460 - 0.0760(1 - \cos \phi) \quad y = 0.0760 \sin \phi \quad -162.2^\circ \leq \phi \leq 15.8^\circ$$

The area can be calculated by numerically integrating the two areas below the suction and pressure side. Use the trapezoidal method (MATLAB built-in function: **trapz**) for integration. Hint: You may need to **sort** those points

