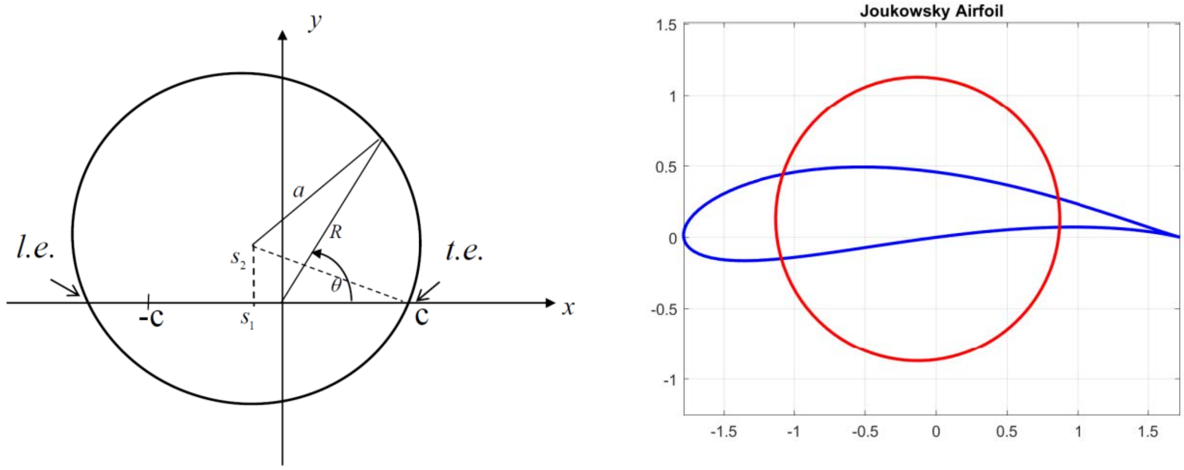

Figure 1: Circle defining the Joukowsky and Kármán-Trefftz transformation with Origin at $(x, y) = (-s_1, s_2)$ and radius a.

The idea behind the Joukowsky transformation is to map a circle in the $z = x + iy$ plane into an airfoil in the $\zeta = \xi + i\eta$ plane through the transformation $\zeta = z + c^2 / z$, where the circle goes through the critical point $x = c$, which then defines the trailing edge (cusp) as discussed in the class. As seen in Fig. 1, the radius of the cylinder is denoted by a and the cylinder is centered at $(x, y) = (-s_1, s_2)$. The circumference of the cylinder is defined by the radius, $R = R(\theta)$, which in the transformed plane defines the contour of the airfoil as a function of the parameter angle $\theta \in [0, 2\pi]$. Here $\theta = 0$ defines the trailing edge and $\theta = \pi$ locates the leading edge. From the theory of the Joukowsky transformation we know that s_1 essentially defines the thickness of the airfoil and s_2 the camber.