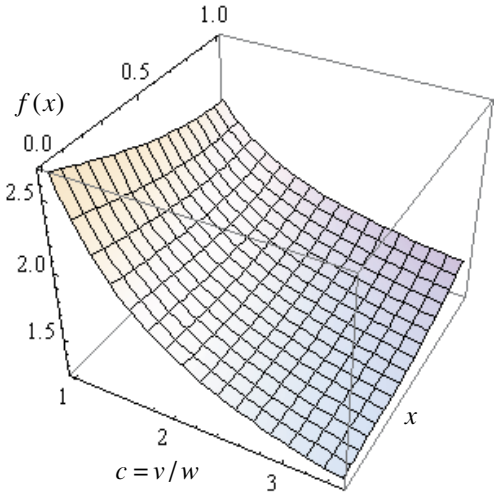


Fig. 8. 3D plot of the average access time as a function of the location of the terminal station and the speed ratio.

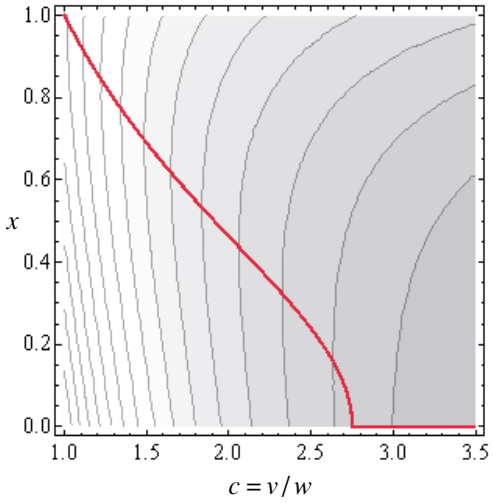


Fig. 9. Contour plot of the average access time as a function of the location of the terminal station and the speed ratio.

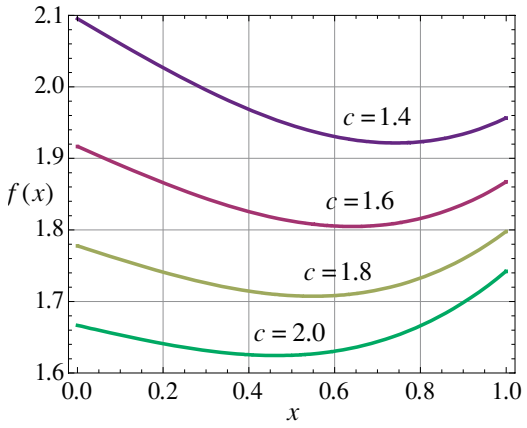


Fig. 10. The average access time as a function of the location of the terminal station for various speed ratios for $c < \pi/(\pi - 2) \approx 2.752$.

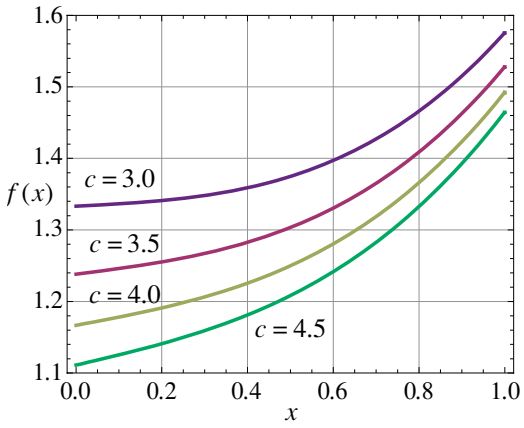


Fig. 11. The average access time as a function of the location of the terminal station for various speed ratios for $c \geq \pi/(\pi - 2) \approx 2.752$.

ing the number of users who can access the airport within a given time $u$.

Let us denote the proportion of users accessible to the airport within a given time by $p(x)$ as a function of the location of the terminal station. To derive this function, the cdf of access time $t$, $\Phi(t|x)$, should be obtained since

$$p(x) = \Phi(t = u|x). \tag{19}$$

By considering that the access time $t$ to the airport is given by

$$t = \frac{s}{w} + \frac{h - x}{v}, \tag{20}$$

$\Phi(t|x)$ can be related to $\Psi(s|x)$, the cdf of the Karlsruhe distance $s$ to the station from points uniformly distributed over the circular city considered in the proceeding section. It should be noted that the minimum access time is given by $(h - x)/v$ and the maximum access time by $(R + x)/w + (h - x)/v$. The second term of Eq. (20) can be treated as a fixed constant $\tau$, so that $s = w(t - \tau)$. Using this relationship, the cdf of the access time $t$, $\Phi(t|x)$, can be related to $\Psi(s|x)$ as follows:

$$\begin{aligned}\Phi(t|x) &= \Pr\left\{\frac{s}{w} + \tau \leq t\right\} \\ &= \Pr\{s \leq w(t - \tau)\} = \Psi(w(t - \tau)|x) \\ &\quad \left(\frac{h - x}{v} \leq t \leq \frac{R + x}{w} + \frac{h - x}{v}\right).\end{aligned} \tag{21}$$

From the above discussions, the problem of maximizing the proportion of users accessible to the airport within a given time $u$ can be formulated as follows:

$$\underset{x}{\text{maximize}}\ p(x) = \Psi(w(u - \tau)|x). \tag{22}$$

The pdf of access time $t$, $\varphi(t|x)$, is in itself an important index which describes the accessibility measure for the airport on a city-wide basis. By differentiating $\Phi(t|x)$ with respect to $t$, we obtain the probability density function of $t$