No solution exists because starting from $t = 0$ and $x(0) = 0$, $x(\alpha(t))$ can never be 0 or positive or negative. If $x$ were positive, the vector field would point in the negative direction. If $x$ were negative, it points in the positive direction. $x$ cannot stay at 0, because $x \neq 0$. Hence, no solution exists.

The solution is not unique, because when two queues have the same length, then the system can switch to one of the two discrete states.

Train should never... (safety property because it can be written as temporal formula $\Box P$)

Train should not have to... (liveness property: can be written as $\Diamond \Box P$; will also satisfy the axiom).

State 3 should be made "unreadable". This can be achieved by modifying the state diagram, e.g., $\text{Fig. 3}$.

The equilibrium is (Lyapunov) unstable. "\text{For Lyapunov stability,}\ 
\forall \epsilon > 0, \exists \delta > 0: \|x(t) - x_0\| < \delta \Rightarrow \|x(t) - x_{eq}\| < \epsilon, \ t > 0\". One cannot make $\|x(t) - x_{eq}\| < \epsilon$ for any $\epsilon < 2$, so it is also not asymptotically stable, "\text{for that it would have to be Lyapunov stable}."

Topological not possible. $\mathcal{E}_1, 2, 3 \neq \{1, 2, 3\}$ which shows that if 12 are arbitrarily close and so are 23, then 1 and 2 will also be the same.

$P(x) = \begin{bmatrix} 0 & c \nu \\ c \nu & 0 \end{bmatrix}$ (c < 2) $\Rightarrow$ $x_1^* = 0$, $x_2^* = 0$

$P(x) = \begin{bmatrix} 2x_1 & x_2 > 0 \\ 0 & 0 \end{bmatrix}$, $\pi(x_1) = 0 \neq 0$

$\pi(x_1) = \begin{bmatrix} x_1 \\ 2x_2 > 0 \end{bmatrix}$, $\pi(x_1) = 0 \neq 0$

\text{not periodic}