$$\begin{array}{rcl}
\dot{v_1} & = & f_1(\bar{x}, t) \\
\dot{x_1} & = & v_1 \\
\dot{v_2} & = & f_2(\bar{x}, t) \\
\dot{x_2} & = & v_2 \\
& \vdots \\
\dot{v_n} & = & f_n(\bar{x}, t) \\
\dot{x_n} & = & v_n
\end{array}$$