$$\dot{v}_1 = f_1(\bar{x}, t)$$
$$\dot{x}_1 = v_1$$
$$\dot{v}_2 = f_2(\bar{x}, t)$$
$$\dot{x}_2 = v_2$$
$$\vdots$$
$$\dot{v}_n = f_n(\bar{x}, t)$$
$$\dot{x}_n = v_n$$