Math 142-1, Group work 6

Problem 1

For each row of the table, explain how you can obtain the wanted item from the quantities that are given to you. If you require initial condition or boundary conditions, state what you need. For example, for **(d)**, I can get $x_k(t)$ from $v_k(t)$ by solving the ODE $x_k'(t) = v_k(t)$ subject to the initial conditions $x_k(0) = x_{k0}$. It will help you to make a drawing with a circle for each quantity. Connect the circles with arrows as you find ways of computing them from each other.

#	Given	Want
(a)	$v_k(t)$	$u(x,t)$
(b)	$u(x,t)$	$v_k(t)$
(c)	$x_k(t)$	$v_k(t)$
(d)	$v_k(t)$	$x_k(t)$
(e)	$q(x,t),\ u(x,t)$	$\rho(x,t)$
(f)	$\rho(x,t),\ u(x,t)$	$q(x,t)$
(g)	$q(x,t),\ \rho(x,t)$	$u(x,t)$
(h)	$\hat{q}(\rho),\ \rho(x,t)$	$q(x,t)$
(i)	$\hat{u}(\rho),\ \rho(x,t)$	$u(x,t)$
(j)	$\rho(x,t),\ u(x,t)$	$\hat{u}(\rho)$
(k)	$\hat{q}(\rho)$	$\hat{u}(\rho)$
(l)	$\hat{u}(\rho)$	$\hat{q}(\rho)$
(m)	$q(x,t)$	$\rho(x,t)$
(n)	$u(x,t)$	$\rho(x,t)$
(o)	$\hat{u}(\rho)$	$\rho(x,t)$
(p)	$\hat{u}(\rho)$	$u(x,t)$
(q)	$\hat{q}(\rho)$	$q(x,t)$
(r)	$x_k(t)$	$\hat{q}(\rho)$
(s)	$\hat{u}(\rho)$	$v_k(t)$
(t)	$\hat{u}(\rho)$	$x_k(t)$