Transaction

Transaction is charaterized by who i sends which amount v_{ij} to who j. We can encode this information in matrix:

$$V := \begin{bmatrix} v_{11} & \cdots & v_{1n} \\ \vdots & \ldots & \vdots \\ v_{n1} & \cdots & v_{nn} \end{bmatrix} \tag{1}$$

But this representation is redundant in a sense that

1. Sending to itself $i = j$ does not make full sense. Or, the amount sent is always 0.
2. Sending an amount from i to j is equivalent to sending the *negative amount* from j to i.

In matrix notation, those redundancy are charaterized by the antisymmetry of V: $V^T = -V$.

Toward the Law of Transaction

The economy is driven by a series of transaction. It makes sense that we consider the trajectory of transaction along time t. We assume transaction does not take place randomly, as suggested by economics, game theory , etc. Here we focus on deterministic behaviour. In this case our system should be endowed with some ordinary differential equation (ODE):

$$\frac{dV}{dt} = K(t, V(t), \dots), \tag{2}$$

where K is an unknown function of time t, V, and possibly some other variables.