Economic-Ecologic Flows

Example: Miller and Blair (2009)

Economic - Ecological Commodity Flows

Interindustry Transactions

		Consuming Sectors					Ecological Commodity Outputs	
		Agriculture	Mining	Manufacturing	Final Demand	Total Output	SO_2	HC
Producing	Sectors							
	Agriculture	1	3	5	3	12	0	1
	Mining	0	2	10	0	12	0	2
	Manufacturing	0	2	6	6	12	4	3
Ecological	Commodity Inputs							
	Water	5	4	8				
	Land	10	10	1				

± See Text for Specific Matrix Algebra Calculations

A Matrix

$$\begin{pmatrix} 1 & 3 & 5 \\ 0 & 2 & 10 \\ 0 & 2 & 6 \end{pmatrix} \begin{pmatrix} 1/12 & 0 & 0 \\ 0 & 1/12 & 0 \\ 0 & 0 & 1/24 \end{pmatrix} = \begin{pmatrix} 0.083 & 0.250 & 0.208 \\ 0.000 & 0.167 & 0.417 \\ 0.000 & 0.167 & 0.250 \end{pmatrix}$$

R Matrix

$$\begin{pmatrix} 5 & 4 & 8 \\ 10 & 10 & 1 \end{pmatrix} \begin{pmatrix} 1/12 & 0 & 0 \\ 0 & 1/12 & 0 \\ 0 & 0 & 1/24 \end{pmatrix} = \begin{pmatrix} 0.417 & 0.333 & 0.333 \\ 0.833 & 0.833 & 0.042 \end{pmatrix}$$

Q Matrix

$$\begin{pmatrix} 0 & 0 & 4 \\ 1 & 2 & 3 \end{pmatrix} \begin{pmatrix} 1/12 & 0 & 0 \\ 0 & 1/12 & 0 \\ 0 & 0 & 1/12 \end{pmatrix} = \begin{pmatrix} 0.000 & 0.000 & 0.167 \\ 0.083 & 0.167 & 0.125 \end{pmatrix}$$

R* Matrix

$$\begin{pmatrix} 0.417 & 0.333 & 0.333 \\ 0.833 & 0.833 & 0.042 \end{pmatrix} \begin{pmatrix} 1.091 & 0.436 & 0.545 \\ 0.000 & 1.350 & 0.750 \\ 0.000 & 0.300 & 1.500 \end{pmatrix} = \begin{pmatrix} 0.455 & 0.732 & 0.977 \\ 0.909 & 1.501 & 1.142 \end{pmatrix}$$

Q* Matrix

$$\begin{pmatrix} 0.000 & 0.000 & 0.167 \\ 0.083 & 0.167 & 0.125 \end{pmatrix} \begin{pmatrix} 1.091 & 0.436 & 0.545 \\ 0.000 & 1.350 & 0.750 \\ 0.000 & 0.300 & 1.500 \end{pmatrix} = \begin{pmatrix} 0.000 & 0.050 & 0.250 \\ 0.011 & 0.299 & 0.358 \end{pmatrix}$$