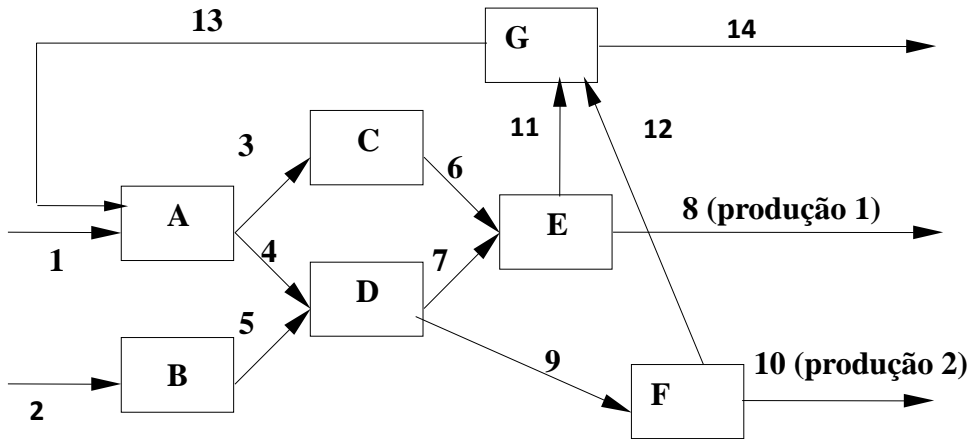


BLOCK DIAGRAMS WITH INPUT-OUTPUT

A factory produces 2 end products: P1 and P2. The operation G treats the effluents from E and F. These two (E and F) are the only productive operations that generate waste. The values of composition are as follows: $f_4 = 0.4$, $f_6 = 0.5$, $f_{11}=0.53$ and $f_{13}=0.26$.



1. Write the mass flows of this production scheme with input-output. Start with
 - a. matrix Z with transactions;
 - b. vectors X (total input);
 - c. Y (final demand);
 - d. PI (primary inputs) .
2. Write matrix A where $a_{ij} = Z_{ij} / X_j$
3. Compute all mass flows considering that $m_8 = 50000$ ton/year and $m_{10} = 30000$ ton/year and $m_{14} = 3800$ ton/year and that the Leontief inverse is:

1,17	0	1,17	0,46	0,82	0,47	0,65
0,13	1	0,134	0,65	0,39	0,65	0,52
0,08	0	1,08	0,03	0,56	0,03	0,31
0,22	0	0,22	1,09	0,66	1,09	0,86
0,16	0	0,16	0,06	1,11	0,06	0,62
0,14	0	0,14	0,06	0,10	1,06	0,55
0,30	0	0,30	0,12	0,21	0,12	1,17

4. Compute m_{13} .

ENVIRONMENTAL FLOWS WITH INPUT-OUTPUT

Consider an economy with 3 sectors of which the following data is available:

$$A = \begin{bmatrix} 0.3 & 0.2 & 0.2 \\ 0.1 & 0.2 & 0.4 \\ 0.2 & 0.2 & 0.1 \end{bmatrix} \quad L = \begin{bmatrix} 1.69 & 0.58 & 0.63 \\ 0.45 & 1.56 & 0.79 \\ 0.48 & 0.48 & 1.43 \end{bmatrix} \quad X = \begin{bmatrix} 1500 \\ 2000 \\ 1500 \end{bmatrix}$$

- Describe the full IO system
- Considering that the direct emissions of CO₂ from each sector are
 $E^L = 120 \quad 60 \quad 180$
and that emissions are distributed proportionally to the monetary value of the flows describe the full IO system for the emissions
- What are the emissions embodied in total final demand?
- What is the A matrix of the IO system for emissions?
- If economic demand increases by 10% in each sector what will be the increase in total emissions?