RH 1.6

MATH 5, Jones

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Refrigerator Homework

1

$$\begin{cases} p_s = 0.8p_g + 0.3p_s \\ p_g = 0.2p_g - 0.7p_s \end{cases} \rightarrow \begin{bmatrix} 0.8 & 0.3-1 & 0 \\ 0.2-1 & 0.7 & 0 \end{bmatrix} \rightarrow \begin{bmatrix} 0.8 & -0.7 \\ -0.8 & 0.7 \end{bmatrix} \begin{bmatrix} p_g \\ p_s \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \end{bmatrix}$$

$0.8p_g = 0.7p_s \Rightarrow \boxed{p_g = \frac{7}{8}p_s}$

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a: $\begin{bmatrix} & A & E & M & T \\ A & 0.65 & 0.3 & 0.3 & 0.2 \\ E & 0.1 & 0.1 & 0.15 & 0.1 \\ M & 0.25 & 0.35 & 0.15 & 0.3 \\ T & 0 & 0.25 & 0.4 & 0.4 \end{bmatrix}$

b: Equations: $p_A = 0.65p_A + 0.30p_E + 0.30p_M + 0.20p_T \quad p_E = 0.10p_A + 0.10p_E + 0.15p_M + 0.10p_T$
$p_M = 0.25p_A + 0.35p_E + 0.15p_M + 0.30p_T \quad p_T = 0.25p_E + 0.40p_M + 0.40p_T$
$0.35p_A - 0.30p_E - 0.30p_M - 0.20p_T = 0 \quad -0.10p_A + 0.90p_E - 0.15p_M - 0.10p_T = 0$
$-0.25p_A - 0.35p_E + 0.85p_M - 0.30p_T = 0 \quad -0.25p_E - 0.40p_M + 0.60p_T = 0$

As a matrix: $\begin{bmatrix} 0.35 & -0.30 & -0.30 & -0.20 & 0 \\ -0.10 & 0.90 & -0.15 & -0.10 & 0 \\ -0.25 & -0.35 & 0.85 & -0.30 & 0 \\ 0 & -0.25 & -0.40 & 0.60 & 0 \end{bmatrix}$

RREF using the Wolfram Compute Engine: $\begin{bmatrix} 1 & 0 & 0 & -2.02786 & 0 \\ 0 & 1 & 0 & -0.531105 & 0 \\ 0 & 0 & 1 & -1.16806 & 0 \\ 0 & 0 & 0 & 0 & 0 \end{bmatrix}$

$p_A = 2.03p_T, \quad p_E = 0.53p_T, \quad p_M = 1.17p_T$
$p_A = 203, \quad p_E = 53, \quad p_M = 117$

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$$\mathrm{Na_3PO_4}:\begin{bmatrix}3\\1\\4\\0\\0\end{bmatrix},\quad \mathrm{Ba(NO_3)_2}:\begin{bmatrix}0\\0\\6\\1\\2\end{bmatrix},\quad \mathrm{Ba_3(PO_4)_2}:\begin{bmatrix}0\\2\\8\\3\\0\end{bmatrix},\quad \mathrm{NaNO_3}:\begin{bmatrix}1\\0\\3\\0\\1\end{bmatrix}\quad\begin{matrix}\text{sodium}\\\text{phosphorus}\\\text{oxygen}\\\text{barium}\\\text{nitrogen}\end{matrix}$$

Row reduced: $\begin{bmatrix}1&0&0&-\frac{1}{3}&0\\0&1&0&-\frac{1}{2}&0\\0&0&1&-\frac{1}{6}&0\\0&0&0&0&0\\0&0&0&0&0\end{bmatrix}$ $\rightarrow 2\mathrm{Na_3PO_4}+3\mathrm{Ba(NO_3)_2}\rightarrow \mathrm{Ba_3(PO_4)_2}+6\mathrm{NaNO_3}$

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$$\mathrm{NaHCO_3}:\begin{bmatrix}1\\1\\1\\3\end{bmatrix},\quad \mathrm{H_3C_6H_5O_7}:\begin{bmatrix}0\\8\\6\\7\end{bmatrix},\quad \mathrm{Na_3C_6H_5O_7}:\begin{bmatrix}3\\5\\6\\7\end{bmatrix},\quad \mathrm{H_2O}:\begin{bmatrix}0\\2\\0\\1\end{bmatrix},\quad \mathrm{CO_2}:\begin{bmatrix}0\\0\\1\\2\end{bmatrix}\quad\begin{matrix}\text{sodium}\\\text{hydrogen}\\\text{carbon}\\\text{oxygen}\end{matrix}$$

$\begin{bmatrix}1&0&-3&0&0&0\\1&8&-5&-2&0&0\\1&6&-6&0&-1&0\\3&7&-7&-1&-2&0\end{bmatrix}$ Becomes $\begin{bmatrix}1&0&0&0&-1&0\\0&1&0&0&-1/3&0\\0&0&1&0&-1/3&0\\0&0&0&1&-1&0\end{bmatrix}$ when row reduced making the equation

$$3\mathrm{NaHCO_3}+\mathrm{H_3C_6H_5O_7}\rightarrow \mathrm{Na_3C_6H_5O_7}+3\mathrm{H_2O}+3\mathrm{CO_2}$$

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$$\begin{array}{rcrcrcl} x_1 & & - & x_3 & - & x_4 & = 40\\ x_1 & + & x_2 & & & & = 200\\ & x_2 & + & x_3 & - & x_5 & = 100\\ & & & x_4 & + & x_5 & = 60 \end{array}$$

$\begin{bmatrix}1&0&-1&-1&0&40\\1&1&0&0&0&200\\0&1&1&0&-1&100\\0&0&0&1&1&60\end{bmatrix}$ becomes $\begin{bmatrix}1&0&-1&0&1&100\\0&1&1&0&-1&100\\0&0&0&1&1&60\\0&0&0&0&0&0\end{bmatrix}$ when row reduced

Computer Homework

1

On next page. Im sick and dont feel like typing out the latex

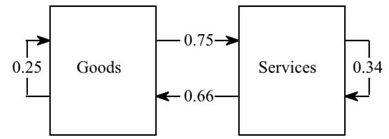
2

3

Question list

- Question 1
- Question 2
- Question 3

Suppose an economy has only two sectors: Goods and Services. Each year, Goods sells 75% of its outputs to Services and keeps the rest, while Services sells 66% of its output to Goods and retains the rest. Find equilibrium prices for the annual outputs of the Goods and Services sectors that make each sector's income match its expenditures.



Denote the prices (that is, dollar values) of the total annual outputs of the Goods and Services sectors by p_G and p_S, respectively.

If $p_S = \$1000$, then $p_G = \$$ 880 . (Type an integer or a decimal.)

If $p_S = \$75$, then $p_G = \$$ 66 . (Type an integer or a decimal.)

Homework: **Section 1.6 Homework**

Question 2, 1.6.5

HW Score: 100%, 10 of 10 points
Points: 3 of 3

Save

Question list

- Question 1
- Question 2
- Question 3

Balance the chemical equation.

$$CS_2 + NH_3 \rightarrow H_2S + NH_4SCN$$

Assume the coefficient of NH_4SCN is 1. What is the balanced equation?

$$1\,CS_2 + 2\,NH_3 \rightarrow 1\,H_2S + 1\,NH_4SCN$$

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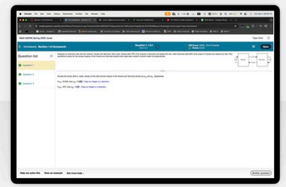
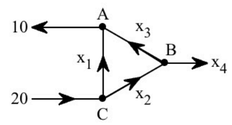


Find the general flow pattern of the network shown in the figure. Assuming that the flows are all nonnegative, what is the largest possible value for x_3?



Find the general flow pattern of the network shown in the figure. Choose the correct answer below and fill in the answer boxes to complete your choice.

A. x_1 is free; x_2 = ; x_3 is free; x_4 =

B. x_1 = ; x_2 is free; x_3 is free; x_4 is free

C. $x_1 = 10 - x_3$; $x_2 = 10 + x_3$; x_3 is free; $x_4 = 10$

D. x_1 = ; x_2 = ; x_3 = ; x_4 =

Assuming that the flows are all nonnegative, what is the largest possible value for x_3?

The largest possible value for x_3 is 10.

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