(rotated content, top left — labeled 4.2)

$$AD = C + I$$
$$C = 2000 + \tfrac{3}{4} Y$$
$$I = 500 - 1000 \, r$$
$$AD = Y$$

$$AD - C - I + 0 = 0$$
$$0 + C + 0 - \tfrac{3}{4} Y = 2000$$
$$0 + 0 + I + 0 = 500 - 1000 \, r$$
$$AD + 0 + 0 - Y = 0$$

$$
\begin{bmatrix} 1 & -1 & -1 & 0 \\ 0 & 1 & 0 & -\tfrac{3}{4} \\ 0 & 0 & 1 & 0 \\ 1 & 0 & 0 & -1 \end{bmatrix}
\cdot
\begin{bmatrix} AD \\ C \\ I \\ Y \end{bmatrix}
=
\begin{bmatrix} 0 \\ 2000 \\ 500 - 1000\,r \\ 0 \end{bmatrix}
$$

4.4 #8

National income = Consumption + Investment + Gov't spending
$$Y \quad = \quad C \quad + \quad I \quad + \quad G$$
Endo , Endo , EXO , EXO

Consumption = auto consumption + marginal prop to consume · national income
$$C \quad = \quad a \quad + \quad b \quad \cdot \quad Y$$
Endo , Para , Para , endo

① Solve for EXO
$$\dfrac{Y - C \; = \; I + G}{\;}$$
$$b Y - C = -a$$

② a) Model → Coefs · Endo = EXO
$$\begin{bmatrix} 1 & -1 \\ b & -1 \end{bmatrix} \cdot \begin{bmatrix} Y \\ C \end{bmatrix} = \begin{bmatrix} I + G \\ -a \end{bmatrix}$$
$$A \qquad x \quad = \quad Y$$
$$\det A = -1 + b = |A|$$

③ b) Find the solution
$$x = A^{-1} Y$$
$$\frac{1}{|A|}\begin{bmatrix} -1 & 1 \\ -b & 1 \end{bmatrix}\begin{bmatrix} I+G \\ -a \end{bmatrix} = \begin{bmatrix} Y \\ C \end{bmatrix}$$
$$\frac{1}{-1+b}\begin{bmatrix} -1 & 1 \\ -b & 1 \end{bmatrix}\begin{bmatrix} I+G \\ -a \end{bmatrix} = \begin{bmatrix} Y \\ C \end{bmatrix}$$
$$\frac{1}{-1+b}\begin{bmatrix} -I-G - a \\ -bI -bG - a \end{bmatrix} \longrightarrow \frac{1}{1-b}\begin{bmatrix} I+G + a \\ bI + bG + a \end{bmatrix}$$
$$Y = \frac{1}{1-b}\big[I + G + a \big]$$
$$C = \frac{1}{1-b}\big[bI + bG + a \big]$$

5.2 #3

$Y = C + I + G$ with G exo

$C = 200 + .8Y$ with 200 exo

$I = 1000 - 2000R$ with R exo

$G = Y - C - I$

$200 = C - .8Y$

$1000 - 2000R = I$

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a) Coef · Endo = Exo

$$\begin{bmatrix} 1 & -1 & -1 \\ -.8 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix} \cdot \begin{bmatrix} Y \\ C \\ I \end{bmatrix} = \begin{bmatrix} G \\ 200 \\ 1000 - 2000R \end{bmatrix}$$

$\quad\quad A \quad\quad\quad x \quad = \quad b$

Inverse of $A = \dfrac{adj\ A}{det\ A}$

$det\ A = 1 \begin{vmatrix} 1 & -1 \\ -.8 & 1 \end{vmatrix} = 1(1 - .8) = .2$

$$\begin{bmatrix} \begin{vmatrix} 1 & 0 \\ 0 & 1 \end{vmatrix} & \begin{vmatrix} -.8 & 0 \\ 0 & 1 \end{vmatrix} & \begin{vmatrix} -.8 & 1 \\ 0 & 0 \end{vmatrix} \\ \begin{vmatrix} -1 & -1 \\ 0 & 1 \end{vmatrix} & \begin{vmatrix} 1 & -1 \\ 0 & 1 \end{vmatrix} & \begin{vmatrix} 1 & -1 \\ 0 & 0 \end{vmatrix} \\ \begin{vmatrix} -1 & -1 \\ 1 & 0 \end{vmatrix} & \begin{vmatrix} 1 & -1 \\ -.8 & 0 \end{vmatrix} & \begin{vmatrix} 1 & -1 \\ -.8 & 1 \end{vmatrix} \end{bmatrix} \rightarrow \begin{bmatrix} 1 & -.8 & 0 \\ -1 & 1 & 0 \\ 1 & -.8 & .2 \end{bmatrix} \rightarrow \begin{bmatrix} + & - & + \\ - & + & - \\ + & - & + \end{bmatrix}$$

$Adj = \begin{bmatrix} 1 & 1 & 1 \\ .8 & 1 & .8 \\ 0 & 0 & .2 \end{bmatrix}$ $Inv = \begin{bmatrix} 5 & 5 & 5 \\ 4 & 5 & 4 \\ 0 & 0 & 1 \end{bmatrix}$

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b) What happens if G falls by 50?

Y falls by $\frac{1}{.2}(50) = 250$