**ITEC451**

**Activity**

Review Problem

Question 22 (Page 48)

steel cars machines

steel .30 .45 .40

22a. A = cars .15 .20 .10

machines .40 .10 .45

Since (Total Steel Produced) = (Steel Consumed) + (Steel used to produce steel, cars and machines),

s = ds + .3s + .45c + .4m.

Similarly we find that

c = dc + .15s + .20c + .10m

and

m = dm + .40s + .10c + .45m.

In matrix form we obtain the following linear system

 =  +  

22c. Just write  as I  and subtract A  from both sides of the answer to 22b.

22d. From our answer to 22c, we find that

 = (I‑A)‑1 

If s≥0,c≥0, and m≥0, then Seriland can meet the required demands. If any of s, c, and m are negative, then Seriland cannot meet the required demands.

22e. Before we increase the amount of required steel by $1,

= (I‑A)‑1 

After increasing amount of required steel by 1,

 =(I‑A)‑1  = Original + (I‑A)‑1 

= Original  + (First column of (I‑A)‑1) .

Thus increasing steel requirements by $1 increases demand for steel by element 1‑1 of (I‑A)‑1,increases demand for cars by element 2‑1 of (I‑A)‑1, and increases demand for machines by element 3‑1 of (I‑A)‑1.