

JZfa02

PROGRAM : LTRANS

AUTHOR : Jan Zijlstra, MTSU.

PURPOSE : To illustrate the action of a  $2 \times 2$  matrix  $A$  associated with the linear transformation  $T: (x,y) \rightarrow (x',y')$  on a figure in the  $xy$ -plane

PLATFORM: Texas Instruments TI 82/83 graphing calculator

**Input** : The user is prompted for the entries of the matrix  $A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$

**Output**: a graph of the  $xy$ -plane showing the original figure, along with the transformed image.  
The matrix  $A$  is shown in the upper left-hand corner of the screen.

| PROGRAM LTRANS             | COMMAND LOCATION   |
|----------------------------|--------------------|
| :Prompt A                  | Prompt: PRG I/O 2  |
| :Prompt B                  |                    |
| :Prompt C                  |                    |
| :Prompt D                  |                    |
| : [[A,B][C,D]]-[A]         | [A]: matrX name 1  |
| : [[1.5,2,1.75,1.5,1.25,1] | [B]: matrX name 2  |
| [1,1.7,2,1.75,2,1.7]]-[B]  |                    |
| : [A]*[B]-[C]              | ClrHome: PRG I/O 8 |
| :ClrHome                   |                    |
| :FnOff                     |                    |
| :PlotsOff                  |                    |
| :ClrDraw                   | Xmin: VARS WINDOW  |
| : -3-Xmin:3-Xmax:1-Xscl    |                    |
| : -3-Ymin:3-Ymax:1-Yscl    | Zsquare: ZOOM 5    |
| :Zsquare                   | FOR: PRG CTL 4     |
| :For(J,1,5,1)              | Line: DRAW 2       |
| :Line([B](1,J),[B](2,J),   |                    |
| [B](1,J+1),[B](2,J+1))     |                    |
| :End                       | END: PRG CTL 7     |
| :Line([B](1,6),[B](2,6),   |                    |
| [B](1,1),[B](2,1))         |                    |
| :For(J,1,5,1)              |                    |
| :Line([C](1,J),[C](2,J),   |                    |
| [C](1,J+1),[C](2,J+1))     |                    |
| :End                       |                    |
| :Line([C](1,6),[C](2,6),   |                    |
| [C](1,1),[C](2,1))         |                    |
| :Text(1,1,A)               | Text: Draw         |
| :Text(1,10,B)              |                    |
| :Text(10,1,C)              |                    |
| :Text(10,10,D)             |                    |