Crouts method demonstration example 2019.bas - 2,508 bytes, modified: 7/31/2019 9:30

#COMPILE EXE

REM *** Crout's method for solution of simultaneous algebraic equations
REM *** applied to the example in the course introduction
GLOBAL M,NEQ,J,I,II,SUM,JM1,K,IP1,IM1,JJ,NN,L AS SINGLE

FUNCTION PBMAIN

DIM A(10,11) AS SINGLE
DIM X(10) AS SINGLE
PRINT "********************************************************************************
PRINT " Crout's method example with four equations: 
PRINT " X1 + 2X2 + 3X3 + 1X4 = 8.98958" 
PRINT " X1 + X2 - 9X3 + X4 = 0.65625" 
PRINT " X1 + 6X3 - X4 = 4.01042" 
PRINT " 5X1 - 2X2 - X3 + 7X4 = 2.14931"
PRINT "********************************************************************************

REM *** Here's where you must input the coefficient matrix.
A(1,1)=1.:A(1,2)=-2.:A(1,3)=3.:A(1,4)=-1.:A(1,5)=-8.98958
A(2,1)=1.:A(2,2)=1.:A(2,3)=-9.:A(2,4)=1.:A(2,5)=-0.65625
A(3,1)=1.:A(3,2)=0.:A(3,3)=6.:A(3,4)=-1.:A(3,5)=4.01042
A(4,1)=-5.:A(4,2)=-2.:A(4,3)=-1.:A(4,4)=7.:A(4,5)=2.14931

REM *** The program yields: 1.50002, 2.999998, 0.4444443, and 0.1562488

REM *** Crout's method of matrix decomposition, NEQ=4 for this example
NEQ=4

M=NEQ+1
FOR J=2 TO M
A(1,J)=A(1,J)/A(1,1):NEXT J
FOR I=2 TO NEQ
J=I
FOR II=J TO NEQ
SUM=0
JM1=J-1
FOR K=1 TO JM1
SUM=SUM+A(II,K)*A(K,J):NEXT K
A(II,J)=A(II,J)-SUM:NEXT II
ENDFOR
IP1=I+1
FOR JJ=IP1 TO M
SUM=0
IM1=I-1
FOR K=1 TO IM1
SUM=SUM+A(I,K)*A(K,JJ):NEXT K
A(I, JJ)=(A(I, JJ)-SUM)/A(I, I):NEXT JJ
ENDFOR
X(NEQ)=A(NEQ, NEQ+1)
L=NEQ-1
FOR NN=1 TO L
SUM=0
I=NEQ-NN
IP1=I+1
FOR J=IP1 TO NEQ
SUM=SUM+A(I, J)*X(J)
NEXT J
X(I)=A(I, M)-SUM:NEXT NN
FOR J=1 TO NEQ
PRINT X(J)
NEXT J
PRINT "Terminate program?"
INPUT "Respond with any positive number"
IF NN=0 THEN 300

300 REM *** continue
END FUNCTION