```
$TITLE: M5-1.GMS, ordinary least squares using NLP

$ONTEXT
there are I observations on two variables (set J), a dependent
variables Y and an independent variable X.

the objective is to estimate a linear relationship vias OLS
minimizing the sum of squared deviations
$OFFTEXT

SETS  I  observations     /I1*I4/
      J  dep and ind var  /J1*J2/;


PARAMETERS
      Y0(I)
      X0(I);


TABLE BENCH(I,J)


      J1     J2
I1     4      2
I2     3      4
I3    10      6
I4    14     11;


DISPLAY BENCH;
```

```
Y0(I)  = BENCH(I, "J1");
X0(I)  = BENCH(I, "J2");

DISPLAY Y0, X0;

VARIABLES
   ALPHA
   BETA
   DEV
   YHAT(I);

EQUATIONS
   EYHAT(I)
   OBJECTIVE;

OBJECTIVE..  DEV =E= SUM(I, (YHAT(I) - Y0(I))*(YHAT(I) - Y0(I)));

EYHAT(I)..   YHAT(I) =E= ALPHA + BETA*X0(I);

MODEL OLS /ALL/;

ALPHA.L = 1;
BETA.L = 1;

SOLVE OLS USING NLP MINIMIZING DEV;
```

```
* process output to get observed and fitted values of Y

PARAMETER
 RESULTS(I,*);


RESULTS(I, "X0") = X0(I);
RESULTS(I, "YHAT") = YHAT.L(I);
RESULTS(I, "Y0") = Y0(I);



DISPLAY RESULTS;

$LIBINCLUDE XLDUMP RESULTS M5-1.XLS SHEET1!C3
```