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$oninline
/*
 GAMS program used to estimate technical efficiency.

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This version will estimate technical efficiency
based on an input oriented DEA model, with
variable returns to scale. Models can
be found in Fare, Grosskopf and Lovell (1994)

This version utilizes the GUSS solver in GAMS.
For more information on the GUSS solver see the GAMS
web site www.gams.com*/

$OFFSYMLIST OFFSYMXREF OFFUELLIST OFFUELXREF

OPTION SOLPRINT=OFF, SYSOUT=OFF, LIMROW=0, LIMCOL=0;

/*NEXT DEFINE INPUTS AND OUTPUTS. There are 6 inputs x1,x2,x3,
x4,x5 and x6; there are 3 outputs y1,y2,y3. The data has 201
observations*/

SET INOUT /x1*x6, y1*y3/

      OUTPUT(INOUT) /y1*y3/
      INPUT(INOUT) /x1*x6/

      OBS /1*201/
      SUBOBS(OBS) /1*201/
      ACTOBS(OBS)
;

/*Next, define an alias for the set SUBOBS, and read in the
data*/

alias (subobs, subobs1);

$OFFLISTING
TABLE ACT(OBS,INOUT)  INPUT OUTPUT TABLE
$ondelim
$INCLUDE "data2.csv"
$offdelim
$ONLISTING

/*The parameter "slice" is needed for the GUSS solver*/

parameter slice(inout) slice of input output data
          eff_k(obs) efficiency report;

VARIABLES
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 lambda        efficiency score
 weight(obs)   weights;

 POSITIVE Variable weight;

 EQUATIONS

   CONSTR1(output)  DEA constraint for each output
   CONSTR2(input)  DEA constraint for each input
   CONSTR3         DEA constraint for variable eturns to scale
;

   CONSTR1(output).. sum(subobs, weight(subobs)*ACT(subobs,output)) =G= slice(output);

   CONSTR2(input).. sum(subobs, weight(subobs)*ACT(subobs,input)) =L= lambda*slice(input);

   CONSTR3..          sum(subobs, weight(subobs)) =E= 1;

MODEL TE /all/;

set h headers /modelstat, solvestat, objval/;

parameter scenrep(obs,h) solution report summary
          scopt /SkipBaseCase 1/;


set dict /subobs. scenario.''
          scopt. opt. scenrep
          slice. param. ACT
          lambda. level. eff_k/;

slice(inout)=0;

option lp=cbc;

solve te minimizing lambda using lp scenario dict;

display scenrep, eff_k;

/*results are printed out to the file 'results_input_test.csv'.
There are other ways to place results in an external file. Refer
to the GAMS manual for more infortmation. Since this program is run on
a Linux system, I use the put utility which comes with GAMS*/

file sr /results_input_test.csv/;

sr.pc=5;

put sr;

put 'obs', 'lambda';
put /;
loop(subobs, put subobs.tl, scenrep(subobs,'objval'):4;
  put /;
```

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    );

putclose;
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