Defect Detection while Setting up an Assembly Line - Analytical Approach to Reduce the N-Dimensional Solution Space

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LINGO Set-Code to Generate Proposed Optimization Model to Identify the Best Sub-Solution Space

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SETS:
d/1..20/: X; !Set of possible defects;
i/1..5/:; !Set of possible levels of control parameter-1, the number of cars to produce;
j/1..6/: ; !Set of possible levels of control parameter-2, the distance that a car must be driven;
ij(i,j): Y, P;
dij(d,i,j): CDF;
ENDSETS

! Objective Function: Minimize the total cost for the test;
MIN = @SUM(ij(u,v): P(u,v)*Y(u,v));

! Ensuring chosen combination meets the defect-capturing requirement;
@FOR(d(m):@SUM(ij(u,v): CDF(m,u,v)*Y(u,v))>= X(m));

! Only one level can be chosen for a control parameter;
@SUM(ij(u,v):Y(u,v))=1 ;

! Non-Negativity;
@FOR(ij(u,v):@BIN(Y(u,v)));
```