```
1          OPTIONS NONOTES NOSTIMER NOSOURCE NOSYNTAXCHECK;
68
69
70         *  AST  504 Program 6
71
72           AB  factorial example
73          with  pdiff  option.
74
75         The context is a  2 by 4 factorial.
76
77         When you run lsmeans   a*b  / pdiff   .....
78         you are getting all pairwise tests
79         of the 8 cell means.
80         This will  give  28  tests  ( based on t-tests ).
81
82         Note how the cells are re-numbered, and
83         then the matrix contains p values for
84         these pairwise tests  ( but in the relabeled form );
85
86
87         *(iii)     lsmeans   a*b  /   pdiff   ;
88
89         *In  a  3 by  4  factorial  we have   12 cell means  ...
90
91         We could also  test  ( pairwise )  between the  12 cell means ..
92
93         This would be testing    ( 12 * 11  ) /  2   =   66  total  tests .
94
95
96
97
98         These are the slice results .
99
100                for example . we test  for equal cell means  in the first column  ( pvalue  = 0.673 ) .
101
102                Ho    mu11  = mu21  = mu31 .
103
104                We also test for equal cell means  in the second column .
105
106                and so on...
107
108
109
110        page 9  is  the results from  pdiff .
111
112                in other words ,  all pairwise  tests  of the  12  means   (   12 * 11 /  2  = 66 ) .
113
114                Note that the the  12 cell means  are re-numbered .
115
116                 1          2         3        4
117
118                  5          6        7        8       and so on ...
119
120        So we are given the p value for  testing   Ho  mu11   = mu 21     (  testing 1  vs   5 )
121
122              the pvalue  =  0.993 .
123
124
125        ;
126
127
128
129        data  ABdata  ;
130
131        seed  =  17711  ;
132
133        do  glue  = 1 to 2 ;
134        do  press  = 1 to 4 ;
135        do rep  = 1 to 4 ;
136
137        if glue  = 1 then stren  =  12 +  1.1*rannor(seed ) ;
138        if glue = 2  then stren  = 12 + 1.1* rannor(seed ) ;
```

```
139         if glue = 2  and press > 2 then stren = 12 + 1.6*press +  0.9*rannor(seed ) ;
140         output;
141         end;
142         end;
143         end;
144
145
146         *  end of  data  step  ========================  ;
147
148
149         *  in  GLM,  test  AB  interaction,
150            then look at the pairwise tests
151            from   pdiff   ;
152
153

NOTE: The data set WORK.ABDATA has 32 observations and 5 variables.
NOTE: DATA statement used (Total process time):
      real time           0.00 seconds
      user cpu time       0.00 seconds
      system cpu time     0.00 seconds
      memory              727.65k
      OS Memory           30372.00k
      Timestamp           12/13/2021 03:38:59 AM
      Step Count                        196  Switch Count  2
      Page Faults                       0
      Page Reclaims                     90
      Page Swaps                        0
      Voluntary Context Switches        11
      Involuntary Context Switches      0
      Block Input Operations            0
      Block Output Operations           264


154         proc  glm  data  = abdata ;
155         class glue press ;
156         model stren = glue press glue * press / ss3 ;
157         lsmeans  glue * press  / pdiff   ;
158         title1  ' Factorial example , with pdiff option ';
159
160         run;

161
162         OPTIONS NONOTES NOSTIMER NOSOURCE NOSYNTAXCHECK;
172
```