

```

1      OPTIONS NONOTES NOSTIMER NOSOURCE NOSYNTAXCHECK;
68
69      *AST    504
70      Repeated measures
71
72      4 levels of drug,
73
74      3 reps per drug level,
75      measure each patient 4 times
76      Time is not random.
77      in sub-plot the trt levels are randomized but not in repeated measures
78
79      e.g
80      Drug 3
81      Err1 8 The first two lines are btw- sub
82
83      Time 3 .. The lines below are within subject
84      T*D 8
85      Error
86      Total
87
88      Strategy
89      Evaluate the variance cov structure(is independent, cs or ar ) most appropriate?
90      Trt by time intraction
91      If it is not significant, then test main effect of trt and time
92
93      Ho for interaction is no interaction
94
95      Since the interaction is significant, you can test drug effect at time 1,2..
96      You are slicing by time.
97
98      compound symmetry
99      sig2 rohsig rohsig
100     rohsig sig2 rohsig
101     rohsig rohsig sig2
102
103     Heterogeneous version, the diagonal element are not the same
104
105     Independence
106     sigsquare o o o
107     0    sigsquare 0 0
108     0    0    sigsquare 0
109     0    0 0 sigsquare
110     ;
111     * create a sample data set ----- ;
112
113
114     data mydata ;
115
116     seed = 17771 ;
117
118     do drug = 1 to 4 ;
119     do person = 1 to 3 ;
120     per = 0.8*rannor(seed) ;
121
122     do time = 1 to 4 ;
123     if drug = 1 then chol =per+ 11.1 + 0.33*rannor(seed) ;
124     if drug = 2 then chol =per+ 11.1- .7*time + .33*rannor(seed) ;
125     if drug = 3 then chol =per+ 11.3 - .9*time + .33*rannor(seed) ;
126     if drug = 4 then chol =per+ 11.6 - 1.2*time + .33*rannor(seed) ;
127     output;
128     end;
129     end;

```

```

130     end;
131
132
133     * we used proc mixed with VC structure as CS -----;
134
135
136

```

NOTE: The data set WORK.MYDATA has 48 observations and 6 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            790.40k
OS Memory          29860.00k
Timestamp          12/13/2021 03:40:46 AM
Step Count                212  Switch Count  2
Page Faults                0
Page Reclaims            92
Page Swaps                0
Voluntary Context Switches 11
Involuntary Context Switches 0
Block Input Operations    0
Block Output Operations   264

```

```

137     proc mixed data = mydata ;
138     class drug person time ;
139     model chol = drug time drug* time ;
140     repeated / subject = person(drug) type = cs r ;
141     lsmeans drug*time / slice = time ;
142     title1 ' Repeated measures , drug and time effect on cholest ' ;
143
144
145     * create the time by drug plot -----;
146
147

```

NOTE: Convergence criteria met.

NOTE: PROCEDURE MIXED used (Total process time):

```

real time          0.11 seconds
user cpu time      0.12 seconds
system cpu time    0.00 seconds
memory            2665.34k
OS Memory          30120.00k
Timestamp          12/13/2021 03:40:46 AM
Step Count                213  Switch Count  3
Page Faults                0
Page Reclaims          142
Page Swaps                0
Voluntary Context Switches 21
Involuntary Context Switches 0
Block Input Operations    0
Block Output Operations   296

```

```

148     proc means data = mydata noprint ;
149     class drug time ;
150     var chol ;
151     output out = meanout mean = mean_y ;
152
153

```

NOTE: There were 48 observations read from the data set WORK.MYDATA.

NOTE: The data set WORK.MEANOUT has 25 observations and 5 variables.

NOTE: PROCEDURE MEANS used (Total process time):

real time	0.00 seconds
user cpu time	0.00 seconds
system cpu time	0.01 seconds
memory	8847.40k
OS Memory	37820.00k
Timestamp	12/13/2021 03:40:46 AM
Step Count	214
Page Faults	0
Page Reclaims	1805
Page Swaps	0
Voluntary Context Switches	41
Involuntary Context Switches	0
Block Input Operations	0
Block Output Operations	264

```

154      proc sgplot  data = meanout ;
155      series  x = time  y = mean_y / group = drug ;
156      where  _type_ = 3 ;
157
158      run;

```

NOTE: PROCEDURE SGPLOT used (Total process time):

real time	0.10 seconds
user cpu time	0.04 seconds
system cpu time	0.01 seconds
memory	7639.50k
OS Memory	34352.00k
Timestamp	12/13/2021 03:40:46 AM
Step Count	215
Page Faults	0
Page Reclaims	1249
Page Swaps	0
Voluntary Context Switches	152
Involuntary Context Switches	0
Block Input Operations	0
Block Output Operations	560

NOTE: There were 16 observations read from the data set WORK.MEANOUT.  
WHERE \_type\_=3;

```

159
160
161      OPTIONS NONOTES NOSTIMER NOSOURCE NOSYNTAXCHECK;
171

```