

Chapter 4 Example 2

The Model for this example is defined by the following equation.

$$y_{ijklmnop} = \mu + P_i + L_j + PL_{ij} + S_{k(ij)} + D_{l(ijk)} + O_m + PO_{im} + LO_{jm} + PLO_{ijm} + SO_{km(ij)} + DO_{lm(ijk)} + A_n + PA_{in} + LA_{jn} + PLA_{ijn} + SA_{kn(ij)} + DA_{ln(ijk)} + OA_{mn} + POA_{imn} + LOA_{jmn} + PLOA_{ijmn} + SOA_{kmn(ij)} + DOA_{lmn(ijk)} + C_o + PC_{io} + LC_{jo} + PLC_{ijo} + SC_{ko(ij)} + DC_{lo(ijk)} + OC_{mo} + POC_{imo} + LOC_{jmo} + PLOC_{ijmo} + SOC_{kmo(ij)} + DOC_{lmo(ijk)} + AC_{no} + PAC_{ino} + LAC_{jno} + PLAC_{ijn} + SAC_{kno(ij)} + DAC_{lno(ijk)} + OAC_{mno} + POAC_{imno} + LOAC_{jmno} + PLOAC_{ijmno} + SOAC_{kmno(ij)} + DOAC_{lmno(ijk)} + \varepsilon_{p(ijklmno)}$$

Source	df	EMS	F_{calc}
P_i	1	$\sigma_\varepsilon^2 + 4\sigma_{DOC}^2 + 8\sigma_{SOC}^2 + 16\sigma_{PLOC}^2 + 32\sigma_{POC}^2 + 8\sigma_{DC}^2 + 16\sigma_{SC}^2 + 32\sigma_{PLC}^2 + 64\sigma_{PC}^2 + 8\sigma_{DO}^2 + 16\sigma_{SO}^2 + 32\sigma_{PLO}^2 + 64\sigma_{PO}^2 + 16\sigma_D^2 + 32\sigma_S^2 + 64\sigma_{PL}^2 + 128\sigma_P^2$	--
L_j	1	$\sigma_\varepsilon^2 + 4\sigma_{DOC}^2 + 8\sigma_{SOC}^2 + 16\sigma_{PLOC}^2 + 32\sigma_{LOC}^2 + 8\sigma_{DC}^2 + 16\sigma_{SC}^2 + 32\sigma_{PLC}^2 + 64\sigma_{LC}^2 + 8\sigma_{DO}^2 + 16\sigma_{SO}^2 + 32\sigma_{PLO}^2 + 64\sigma_{LO}^2 + 16\sigma_D^2 + 32\sigma_S^2 + 64\sigma_{PL}^2 + 128\sigma_L^2$	--
PL_{ij}	1	$\sigma_\varepsilon^2 + 4\sigma_{DOC}^2 + 8\sigma_{SOC}^2 + 16\sigma_{PLOC}^2 + 8\sigma_{DC}^2 + 16\sigma_{SC}^2 + 32\sigma_{PLC}^2 + 8\sigma_{DO}^2 + 16\sigma_{SO}^2 + 32\sigma_{PLO}^2 + 16\sigma_D^2 + 32\sigma_S^2 + 64\sigma_{PL}^2$	--
$S_{k(ij)}$	4	$\sigma_\varepsilon^2 + 4\sigma_{DOC}^2 + 8\sigma_{SOC}^2 + 8\sigma_{DC}^2 + 16\sigma_{SC}^2 + 8\sigma_{DO}^2 + 16\sigma_{SO}^2 + 16\sigma_D^2 + 32\sigma_S^2$	--
$D_{l(ijk)}$	8	$\sigma_\varepsilon^2 + 4\sigma_{DOC}^2 + 8\sigma_{DC}^2 + 8\sigma_{DO}^2 + 16\sigma_D^2$	--
O_m	1	$\sigma_\varepsilon^2 + 4\sigma_{DOC}^2 + 8\sigma_{SOC}^2 + 16\sigma_{PLOC}^2 + 32\sigma_{LOC}^2 + 32\sigma_{POC}^2 + 64\sigma_{OC}^2 + 8\sigma_{DO}^2 + 16\sigma_{SO}^2 + 32\sigma_{PLO}^2 + 64\sigma_{LO}^2 + 64\sigma_{PO}^2 + 128\sigma_O^2$	--
PO_{im}	1	$\sigma_\varepsilon^2 + 4\sigma_{DOC}^2 + 8\sigma_{SOC}^2 + 16\sigma_{PLOC}^2 + 32\sigma_{POC}^2 + 8\sigma_{DO}^2 + 16\sigma_{SO}^2 + 32\sigma_{PLO}^2 + 64\sigma_{PO}^2$	--
LO_{jm}	1	$\sigma_\varepsilon^2 + 4\sigma_{DOC}^2 + 8\sigma_{SOC}^2 + 16\sigma_{PLOC}^2 + 32\sigma_{LOC}^2 + 8\sigma_{DO}^2 + 16\sigma_{SO}^2 + 32\sigma_{PLO}^2 + 64\sigma_{LO}^2$	--
PLO_{ijm}	1	$\sigma_\varepsilon^2 + 4\sigma_{DOC}^2 + 8\sigma_{SOC}^2 + 16\sigma_{PLOC}^2 + 8\sigma_{DO}^2 + 16\sigma_{SO}^2 + 32\sigma_{PLO}^2$	--
$SO_{km(ij)}$	4	$\sigma_\varepsilon^2 + 4\sigma_{DOC}^2 + 8\sigma_{SOC}^2 + 8\sigma_{DO}^2 + 16\sigma_{SO}^2$	--

Source	df	EMS	F_{calc}
$DO_{lm(ijk)}$	8	$\sigma_\varepsilon^2 + 4\sigma_{DOC}^2 + 8\sigma_{DO}^2$	$MS(DO)/MS(DOC)$
A_n	1	$\sigma_\varepsilon^2 + 2\sigma_{DOAC}^2 + 4\sigma_{SOAC}^2 + 8\sigma_{PLOAC}^2 + 16\sigma_{LOAC}^2 + 16\sigma_{POAC}^2 + 32\sigma_{OAC}^2 + 4\sigma_{DAC}^2 + 8\sigma_{SAC}^2 + 16\sigma_{PLAC}^2 + 32\sigma_{LAC}^2 + 32\sigma_{PAC}^2 + 64\sigma_{AC}^2 + 4\sigma_{DOA}^2 + 8\sigma_{SOA}^2 + 16\sigma_{PLOA}^2 + 32\sigma_{LOA}^2 + 32\sigma_{POA}^2 + 64\sigma_{OA}^2 + 8\sigma_{DA}^2 + 16\sigma_{SA}^2 + 32\sigma_{PLA}^2 + 64\sigma_{LA}^2 + 64\sigma_{PA}^2 + 128\sigma_A^2$	--
PA_{in}	1	$\sigma_\varepsilon^2 + 2\sigma_{DOAC}^2 + 4\sigma_{SOAC}^2 + 8\sigma_{PLOAC}^2 + 16\sigma_{POAC}^2 + 4\sigma_{DAC}^2 + 8\sigma_{SAC}^2 + 16\sigma_{PLAC}^2 + 32\sigma_{PAC}^2 + 4\sigma_{DOA}^2 + 8\sigma_{SOA}^2 + 16\sigma_{PLOA}^2 + 32\sigma_{POA}^2 + 8\sigma_{DA}^2 + 16\sigma_{SA}^2 + 32\sigma_{PLA}^2 + 64\sigma_{PA}^2$	--
LA_{jn}	1	$\sigma_\varepsilon^2 + 2\sigma_{DOAC}^2 + 4\sigma_{SOAC}^2 + 8\sigma_{PLOAC}^2 + 16\sigma_{LOAC}^2 + 4\sigma_{DAC}^2 + 8\sigma_{SAC}^2 + 16\sigma_{PLAC}^2 + 32\sigma_{LAC}^2 + 4\sigma_{DOA}^2 + 8\sigma_{SOA}^2 + 16\sigma_{PLOA}^2 + 32\sigma_{LOA}^2 + 8\sigma_{DA}^2 + 16\sigma_{SA}^2 + 32\sigma_{PLA}^2 + 64\sigma_{LA}^2$	--
PLA_{ijn}	1	$\sigma_\varepsilon^2 + 2\sigma_{DOAC}^2 + 4\sigma_{SOAC}^2 + 8\sigma_{PLOAC}^2 + 4\sigma_{DAC}^2 + 8\sigma_{SAC}^2 + 16\sigma_{PLAC}^2 + 4\sigma_{DOA}^2 + 8\sigma_{SOA}^2 + 16\sigma_{PLOA}^2 + 8\sigma_{DA}^2 + 16\sigma_{SA}^2 + 32\sigma_{PLA}^2$	--
$SA_{kn(ij)}$	4	$\sigma_\varepsilon^2 + 2\sigma_{DOAC}^2 + 4\sigma_{SOAC}^2 + 4\sigma_{DAC}^2 + 8\sigma_{SAC}^2 + 4\sigma_{DOA}^2 + 8\sigma_{SOA}^2 + 8\sigma_{DA}^2 + 16\sigma_{SA}^2$	--
$DA_{ln(ijk)}$	8	$\sigma_\varepsilon^2 + 2\sigma_{DOAC}^2 + 4\sigma_{DAC}^2 + 4\sigma_{DOA}^2 + 8\sigma_{DA}^2$	--
OA_{mn}	1	$\sigma_\varepsilon^2 + 2\sigma_{DOAC}^2 + 4\sigma_{SOAC}^2 + 8\sigma_{PLOAC}^2 + 16\sigma_{LOAC}^2 + 16\sigma_{POAC}^2 + 32\sigma_{OAC}^2 + 4\sigma_{DOA}^2 + 8\sigma_{SOA}^2 + 16\sigma_{PLOA}^2 + 32\sigma_{LOA}^2 + 32\sigma_{POA}^2 + 64\sigma_{OA}^2$	--
POA_{imn}	1	$\sigma_\varepsilon^2 + 2\sigma_{DOAC}^2 + 4\sigma_{SOAC}^2 + 8\sigma_{PLOAC}^2 + 16\sigma_{POAC}^2 + 4\sigma_{DOA}^2 + 8\sigma_{SOA}^2 + 16\sigma_{PLOA}^2 + 32\sigma_{POA}^2$	--
LOA_{jmn}	1	$\sigma_\varepsilon^2 + 2\sigma_{DOAC}^2 + 4\sigma_{SOAC}^2 + 8\sigma_{PLOAC}^2 + 16\sigma_{LOAC}^2 + 4\sigma_{DOA}^2 + 8\sigma_{SOA}^2 + 16\sigma_{PLOA}^2 + 32\sigma_{LOA}^2$	--
$PLOA_{ijmn}$	1	$\sigma_\varepsilon^2 + 2\sigma_{DOAC}^2 + 4\sigma_{SOAC}^2 + 8\sigma_{PLOAC}^2 + 4\sigma_{DOA}^2 + 8\sigma_{SOA}^2 + 16\sigma_{PLOA}^2$	--
$SOA_{kmn(ij)}$	4	$\sigma_\varepsilon^2 + 2\sigma_{DOAC}^2 + 4\sigma_{SOAC}^2 + 4\sigma_{DOA}^2 + 8\sigma_{SOA}^2$	--
$DOA_{lmn(ijk)}$	8	$\sigma_\varepsilon^2 + 2\sigma_{DOAC}^2 + 4\sigma_{DOA}^2$	$MS(DOA)/MS(DOAC)$
C_o	1	$\sigma_\varepsilon^2 + 4\sigma_{DOC}^2 + 8\sigma_{SOC}^2 + 16\sigma_{PLOC}^2 + 32\sigma_{LOC}^2 + 32\sigma_{POC}^2 + 64\sigma_{OC}^2 + 8\sigma_{DC}^2 + 16\sigma_{SC}^2 + 32\sigma_{PLC}^2 + 64\sigma_{LC}^2 + 64\sigma_{PC}^2 + 128\sigma_C^2$	--
PC_{io}	1	$\sigma_\varepsilon^2 + 4\sigma_{DOC}^2 + 8\sigma_{SOC}^2 + 16\sigma_{PLOC}^2 + 32\sigma_{POC}^2 + 8\sigma_{DC}^2 + 16\sigma_{SC}^2 + 32\sigma_{PLC}^2 + 64\sigma_{PC}^2$	--
LC_{jo}	1	$\sigma_\varepsilon^2 + 4\sigma_{DOC}^2 + 8\sigma_{SOC}^2 + 16\sigma_{PLOC}^2 + 32\sigma_{LOC}^2 + 8\sigma_{DC}^2 + 16\sigma_{SC}^2 + 32\sigma_{PLC}^2 + 64\sigma_{LC}^2$	--

Source	df	EMS	F_{calc}
PLC_{ijo}	1	$\sigma_\varepsilon^2 + 4\sigma_{DOC}^2 + 8\sigma_{SOC}^2 + 16\sigma_{PLOC}^2 + 8\sigma_{DC}^2 + 16\sigma_{SC}^2 + 32\sigma_{PLC}^2$	--
$SC_{ko(ij)}$	4	$\sigma_\varepsilon^2 + 4\sigma_{DOC}^2 + 8\sigma_{SOC}^2 + 8\sigma_{DC}^2 + 16\sigma_{SC}^2$	--
$DC_{lo(ijk)}$	8	$\sigma_\varepsilon^2 + 4\sigma_{DOC}^2 + 8\sigma_{DC}^2$	$MS(DC)/MS(DOC)$
OC_{mo}	1	$\sigma_\varepsilon^2 + 4\sigma_{DOC}^2 + 8\sigma_{SOC}^2 + 16\sigma_{PLOC}^2 + 32\sigma_{LOC}^2 + 32\sigma_{POC}^2 + 64\sigma_{OC}^2$	--
POC_{imo}	1	$\sigma_\varepsilon^2 + 4\sigma_{DOC}^2 + 8\sigma_{SOC}^2 + 16\sigma_{PLOC}^2 + 32\sigma_{POC}^2$	$MS(POC)/MS(PLOC)$
LOC_{jmo}	1	$\sigma_\varepsilon^2 + 4\sigma_{DOC}^2 + 8\sigma_{SOC}^2 + 16\sigma_{PLOC}^2 + 32\sigma_{LOC}^2$	$MS(LOC)/MS(PLOC)$
$PLOC_{ijmo}$	1	$\sigma_\varepsilon^2 + 4\sigma_{DOC}^2 + 8\sigma_{SOC}^2 + 16\sigma_{PLOC}^2$	$MS(PLOC)/MS(SOC)$
$SOC_{kmo(ij)}$	4	$\sigma_\varepsilon^2 + 4\sigma_{DOC}^2 + 8\sigma_{SOC}^2$	$MS(SOC)/MS(DOC)$
$DOC_{lmo(ijk)}$	8	$\sigma_\varepsilon^2 + 4\sigma_{DOC}^2$	$MS(DOC)/MS(\varepsilon)$
AC_{no}	1	$\sigma_\varepsilon^2 + 2\sigma_{DOAC}^2 + 4\sigma_{SOAC}^2 + 8\sigma_{PLOAC}^2 + 16\sigma_{LOAC}^2 + 16\sigma_{POAC}^2 + 32\sigma_{OAC}^2 + 4\sigma_{DAC}^2 + 8\sigma_{SAC}^2 + 16\sigma_{PLAC}^2 + 32\sigma_{LAC}^2 + 32\sigma_{PAC}^2 + 64\sigma_{AC}^2$	--
PAC_{ino}	1	$\sigma_\varepsilon^2 + 2\sigma_{DOAC}^2 + 4\sigma_{SOAC}^2 + 8\sigma_{PLOAC}^2 + 16\sigma_{POAC}^2 + 4\sigma_{DAC}^2 + 8\sigma_{SAC}^2 + 16\sigma_{PLAC}^2 + 32\sigma_{PAC}^2$	--
LAC_{jno}	1	$\sigma_\varepsilon^2 + 2\sigma_{DOAC}^2 + 4\sigma_{SOAC}^2 + 8\sigma_{PLOAC}^2 + 16\sigma_{LOAC}^2 + 4\sigma_{DAC}^2 + 8\sigma_{SAC}^2 + 16\sigma_{PLAC}^2 + 32\sigma_{LAC}^2$	--
$PLAC_{ijno}$	1	$\sigma_\varepsilon^2 + 2\sigma_{DOAC}^2 + 4\sigma_{SOAC}^2 + 8\sigma_{PLOAC}^2 + 4\sigma_{DAC}^2 + 8\sigma_{SAC}^2 + 16\sigma_{PLAC}^2$	--
$SAC_{kno(ij)}$	4	$\sigma_\varepsilon^2 + 2\sigma_{DOAC}^2 + 4\sigma_{SOAC}^2 + 4\sigma_{DAC}^2 + 8\sigma_{SAC}^2$	--
$DAC_{lno(ijk)}$	8	$\sigma_\varepsilon^2 + 2\sigma_{DOAC}^2 + 4\sigma_{DAC}^2$	$MS(DAC)/MS(DOAC)$
OAC_{mno}	1	$\sigma_\varepsilon^2 + 2\sigma_{DOAC}^2 + 4\sigma_{SOAC}^2 + 8\sigma_{PLOAC}^2 + 16\sigma_{LOAC}^2 + 16\sigma_{POAC}^2 + 32\sigma_{OAC}^2$	--
$POAC_{imno}$	1	$\sigma_\varepsilon^2 + 2\sigma_{DOAC}^2 + 4\sigma_{SOAC}^2 + 8\sigma_{PLOAC}^2 + 16\sigma_{POAC}^2$	$MS(POAC)/MS(PLOAC)$
$LOAC_{jmno}$	1	$\sigma_\varepsilon^2 + 2\sigma_{DOAC}^2 + 4\sigma_{SOAC}^2 + 8\sigma_{PLOAC}^2 + 16\sigma_{LOAC}^2$	$MS(LOAC)/MS(PLOAC)$
$PLOAC_{ijmno}$	1	$\sigma_\varepsilon^2 + 2\sigma_{DOAC}^2 + 4\sigma_{SOAC}^2 + 8\sigma_{PLOAC}^2$	$MS(PLOAC)/MS(SOAC)$
$SOAC_{kmno(ij)}$	4	$\sigma_\varepsilon^2 + 2\sigma_{DOAC}^2 + 4\sigma_{SOAC}^2$	$MS(SOAC)/MS(DOAC)$
$DOAC_{lmno(ijk)}$	8	$\sigma_\varepsilon^2 + 2\sigma_{DOAC}^2$	$MS(DOAC)/MS(\varepsilon)$
$\varepsilon_{p(ijklmno)}$	28	σ_ε^2	--