```
c_{10} = Simplify[D[F_4, \beta_1] /. \{\beta_1 \rightarrow 0, \beta_2 \rightarrow 0\}]
  -((16(-1+\lambda_1)(-1+\lambda_2)(-48+266\lambda_2-629\lambda_2^2+793\lambda_2^3-
                                                                                                                   535 \lambda_{2}^{4} + 171 \lambda_{2}^{5} - 18 \lambda_{2}^{6} + 6 \lambda_{1}^{5} \left(25 - 54 \lambda_{2} + 18 \lambda_{2}^{2}\right) + \lambda_{1}^{4} \left(-715 + 2031 \lambda_{2} - 1638 \lambda_{2}^{2} + 432 \lambda_{2}^{3}\right) + \lambda_{1}^{4} \left(-715 + 2031 \lambda_{2} - 1638 \lambda_{2}^{2} + 432 \lambda_{2}^{3}\right) + \lambda_{1}^{4} \left(-715 + 2031 \lambda_{2} - 1638 \lambda_{2}^{2} + 432 \lambda_{2}^{3}\right) + \lambda_{1}^{4} \left(-715 + 2031 \lambda_{2} - 1638 \lambda_{2}^{2} + 432 \lambda_{2}^{3}\right) + \lambda_{1}^{4} \left(-715 + 2031 \lambda_{2} - 1638 \lambda_{2}^{2} + 432 \lambda_{2}^{3}\right) + \lambda_{1}^{4} \left(-715 + 2031 \lambda_{2} - 1638 \lambda_{2}^{2} + 432 \lambda_{2}^{3}\right) + \lambda_{1}^{4} \left(-715 + 2031 \lambda_{2} - 1638 \lambda_{2}^{2} + 432 \lambda_{2}^{3}\right) + \lambda_{1}^{4} \left(-715 + 2031 \lambda_{2} - 1638 \lambda_{2}^{2} + 432 \lambda_{2}^{3}\right) + \lambda_{1}^{4} \left(-715 + 2031 \lambda_{2} - 1638 \lambda_{2}^{2} + 432 \lambda_{2}^{3}\right) + \lambda_{1}^{4} \left(-715 + 2031 \lambda_{2} - 1638 \lambda_{2}^{2} + 432 \lambda_{2}^{3}\right) + \lambda_{1}^{4} \left(-715 + 2031 \lambda_{2} - 1638 \lambda_{2}^{2} + 432 \lambda_{2}^{3}\right) + \lambda_{1}^{4} \left(-715 + 2031 \lambda_{2} - 1638 \lambda_{2}^{2} + 432 \lambda_{2}^{3}\right) + \lambda_{1}^{4} \left(-715 + 2031 \lambda_{2} - 1638 \lambda_{2}^{2} + 432 \lambda_{2}^{3}\right) + \lambda_{1}^{4} \left(-715 + 2031 \lambda_{2} - 1638 \lambda_{2}^{2} + 432 \lambda_{2}^{3}\right) + \lambda_{1}^{4} \left(-715 + 2031 \lambda_{2} - 1638 \lambda_{2}^{2} + 432 \lambda_{2}^{3}\right) + \lambda_{1}^{4} \left(-715 + 2031 \lambda_{2} - 1638 \lambda_{2}^{2} + 432 \lambda_{2}^{3}\right) + \lambda_{1}^{4} \left(-715 + 2031 \lambda_{2} + 1638 \lambda_{2}^{2} + 432 \lambda_{2}^{3}\right) + \lambda_{1}^{4} \left(-715 + 2031 \lambda_{2} + 1638 \lambda_{2}^{2} + 432 \lambda_{2}^{3}\right) + \lambda_{1}^{4} \left(-715 + 2031 \lambda_{2} + 1638 \lambda_{2}^{2} + 432 \lambda_{2}^{2}\right) + \lambda_{1}^{4} \left(-715 + 2031 \lambda_{2} + 1638 \lambda_{2}^{2} + 432 \lambda_{2}^{2}\right) + \lambda_{1}^{4} \left(-715 + 2031 \lambda_{2} + 1638 \lambda_{2}^{2} + 432 \lambda_{2}^{2}\right) + \lambda_{1}^{4} \left(-715 + 2031 \lambda_{2} + 1638 \lambda_{2}^{2} + 432 \lambda_{2}^{2}\right) + \lambda_{1}^{4} \left(-715 + 2031 \lambda_{2} + 1638 \lambda_{2}^{2} + 1638 \lambda_{2}^{2}\right) + \lambda_{1}^{4} \left(-715 + 2031 \lambda_{2} + 1638 \lambda_{2}^{2}\right) + \lambda_{1}^{4} \left(-715 + 2031 \lambda_{2} + 1638 \lambda_{2}^{2}\right) + \lambda_{1}^{4} \left(-715 + 2031 \lambda_{2} + 1638 \lambda_{2}^{2}\right) + \lambda_{1}^{4} \left(-715 + 2031 \lambda_{2} + 1638 \lambda_{2}^{2}\right) + \lambda_{1}^{4} \left(-715 + 2031 \lambda_{2} + 1638 \lambda_{2}^{2}\right) + \lambda_{1}^{4} \left(-715 + 2031 \lambda_{2} + 1638 \lambda_{2}^{2}\right) + \lambda_{1}^{4} \left(-715 + 2031 \lambda_{2} + 1638 \lambda_{2}^{2}\right) + \lambda_{1}^{4} \left(-715 + 2031 \lambda_{2} + 1638 \lambda_{2}^{2}\right) + 
                                                                                                                 \lambda_{1}^{3} (1262 - 4453 \lambda_{2} + 5481 \lambda_{2}^{2} - 2988 \lambda_{2}^{3} + 648 \lambda_{2}^{4}) + \lambda_{1}^{2} (-1021 + 4295 \lambda_{2} - 6960 \lambda_{2}^{2} + 5640 \lambda_{2}^{3} - 2376 \lambda_{2}^{4} + 432 \lambda_{2}^{5}) +
                                                                                                                   \lambda_1 \left( 374 - 1818 \lambda_2 + 3598 \lambda_2^2 - 3757 \lambda_2^3 + 2211 \lambda_2^4 - 720 \lambda_2^5 + 108 \lambda_2^6 \right) + 4 \alpha_0 \left( -2 + 3 \lambda_1 \right) \left( 2 - 9 \lambda_2 + 9 \lambda_2^2 \right)
                                                                                                                                     \left(8 \lambda_{1}^{5}+4 \lambda_{1}^{4} \left(-11+9 \lambda_{2}\right)+2 \lambda_{1}^{3} \left(45-78 \lambda_{2}+32 \lambda_{2}^{2}\right)+\left(-1+\lambda_{2}\right)^{2} \left(-6+19 \lambda_{2}-16 \lambda_{2}^{2}+4 \lambda_{2}^{3}\right)+\right)
                                                                                                                                                                    \lambda_{1}^{2} \left(-85+235 \lambda_{2}-204 \lambda_{2}^{2}+56 \lambda_{2}^{3}\right)+\lambda_{1} \left(37-145 \lambda_{2}+200 \lambda_{2}^{2}-116 \lambda_{2}^{3}+24 \lambda_{2}^{4}\right)\right)\right)
                                                    \left( \ \left( \ -2 + \lambda_1 + \lambda_2 \right)^2 \ \left( -1 + \lambda_1 + \lambda_2 \right)^2 \ \left( -3 + 2 \ \lambda_1 + 2 \ \lambda_2 \right) \ \left( -1 + 2 \ \lambda_1 + 2 \ \lambda_2 \right) \ \left( -5 + 3 \ \lambda_1 + 3 \ \lambda_2 \right) \right) 
                                                                                     (-4 + 3 \lambda_1 + 3 \lambda_2) (-2 + 3 \lambda_1 + 3 \lambda_2))
c_{01} = Simplify[D[F_4, \beta_2] /. \{\beta_1 \rightarrow 0, \beta_2 \rightarrow 0\}]
  -((16(-1+\lambda_1)(-1+\lambda_2)(48-374\lambda_2+1021\lambda_2^2-1262\lambda_2^3+715\lambda_2^4-
                                                                                                                   150 \lambda_2^5 - 18 \lambda_1^6 (-1 + 6 \lambda_2) - 9 \lambda_1^5 (19 - 80 \lambda_2 + 48 \lambda_2^2) + \lambda_1^4 (535 - 2211 \lambda_2 + 2376 \lambda_2^2 - 648 \lambda_2^3) + \lambda_1^4 (535 - 2211 \lambda_2 + 2376 \lambda_2^2 - 648 \lambda_2^3) + \lambda_1^4 (535 - 2211 \lambda_2 + 2376 \lambda_2^2 - 648 \lambda_2^3) + \lambda_1^4 (535 - 2211 \lambda_2 + 2376 \lambda_2^2 - 648 \lambda_2^3) + \lambda_1^4 (535 - 2211 \lambda_2 + 2376 \lambda_2^2 - 648 \lambda_2^3) + \lambda_1^4 (535 - 2211 \lambda_2 + 2376 \lambda_2^2 - 648 \lambda_2^3) + \lambda_1^4 (535 - 2211 \lambda_2 + 2376 \lambda_2^2 - 648 \lambda_2^3) + \lambda_1^4 (535 - 2211 \lambda_2 + 2376 \lambda_2^2 - 648 \lambda_2^3) + \lambda_1^4 (535 - 2211 \lambda_2 + 2376 \lambda_2^2 - 648 \lambda_2^3) + \lambda_1^4 (535 - 2211 \lambda_2 + 2376 \lambda_2^2 - 648 \lambda_2^3) + \lambda_1^4 (535 - 2211 \lambda_2 + 2376 \lambda_2^2 - 648 \lambda_2^3) + \lambda_1^4 (535 - 2211 \lambda_2 + 2376 \lambda_2^2 - 648 \lambda_2^3) + \lambda_1^4 (535 - 2211 \lambda_2 + 2376 \lambda_2^2 - 648 \lambda_2^3) + \lambda_1^4 (535 - 2211 \lambda_2 + 2376 \lambda_2^2 - 648 \lambda_2^3) + \lambda_1^4 (535 - 2211 \lambda_2 + 2376 \lambda_2^2 - 648 \lambda_2^3) + \lambda_1^4 (535 - 2211 \lambda_2 + 2376 \lambda_2^2 - 648 \lambda_2^3) + \lambda_1^4 (535 - 2211 \lambda_2 + 2376 \lambda_2^2 - 648 \lambda_2^3) + \lambda_1^4 (535 - 2211 \lambda_2 + 2376 \lambda_2^2 - 648 \lambda_2^3) + \lambda_1^4 (535 - 2211 \lambda_2 + 2376 \lambda_2^2 - 648 \lambda_2^3) + \lambda_1^4 (535 - 2211 \lambda_2 + 2376 \lambda_2^2 - 648 \lambda_2^3) + \lambda_1^4 (535 - 2211 \lambda_2 + 2376 \lambda_2^2 - 648 \lambda_2^3) + \lambda_1^4 (535 - 2211 \lambda_2 + 2376 \lambda_2^2 - 648 \lambda_2^2) + \lambda_1^4 (535 - 2211 \lambda_2 + 2376 \lambda_2^2 - 648 \lambda_2^2) + \lambda_1^4 (535 - 2211 \lambda_2 + 2376 \lambda_2^2 - 648 \lambda_2^2) + \lambda_1^4 (535 - 2211 \lambda_2 + 2376 \lambda_2^2 - 648 \lambda_2^2) + \lambda_1^4 (535 - 2211 \lambda_2 + 2376 \lambda_2^2 - 648 \lambda_2^2 - 648 \lambda_2^2 - 648 \lambda_2^2 - 648 \lambda_2^2) + \lambda_1^4 (535 - 2211 \lambda_2 + 2376 \lambda_2^2 - 648 \lambda_2^2 - 
                                                                                                                 \lambda_{1}^{3} \left(-793 + 3757 \ \lambda_{2} - 5640 \ \lambda_{2}^{2} + 2988 \ \lambda_{2}^{3} - 432 \ \lambda_{2}^{4}\right) + \lambda_{1}^{2} \left(629 - 3598 \ \lambda_{2} + 6960 \ \lambda_{2}^{2} - 5481 \ \lambda_{2}^{3} + 1638 \ \lambda_{2}^{4} - 108 \ \lambda_{2}^{5}\right) + \lambda_{1}^{2} \left(-793 + 3757 \ \lambda_{2} - 5640 \ \lambda_{2}^{2} + 2988 \ \lambda_{2}^{3} - 432 \ \lambda_{2}^{4}\right) + \lambda_{1}^{2} \left(629 - 3598 \ \lambda_{2} + 6960 \ \lambda_{2}^{2} - 5481 \ \lambda_{2}^{3} + 1638 \ \lambda_{2}^{4} - 108 \ \lambda_{2}^{5}\right) + \lambda_{2}^{2} \left(-793 + 3757 \ \lambda_{2} - 5640 \ \lambda_{2}^{2} + 2988 \ \lambda_{2}^{3} - 432 \ \lambda_{2}^{4}\right) + \lambda_{1}^{2} \left(629 - 3598 \ \lambda_{2} + 6960 \ \lambda_{2}^{2} - 5481 \ \lambda_{2}^{3} + 1638 \ \lambda_{2}^{4} - 108 \ \lambda_{2}^{5}\right) + \lambda_{2}^{2} \left(-793 + 3757 \ \lambda_{2} - 5640 \ \lambda_{2}^{2} + 2988 \ \lambda_{2}^{3} - 432 \ \lambda_{2}^{4}\right) + \lambda_{1}^{2} \left(629 - 3598 \ \lambda_{2} + 6960 \ \lambda_{2}^{2} - 5481 \ \lambda_{2}^{3} + 1638 \ \lambda_{2}^{4} - 108 \ \lambda_{2}^{5}\right) + \lambda_{2}^{2} \left(-793 + 3757 \ \lambda_{2} - 5640 \ \lambda_{2}^{2} + 2988 \ \lambda_{2}^{3} - 432 \ \lambda_{2}^{4}\right) + \lambda_{1}^{2} \left(629 - 3598 \ \lambda_{2} + 6960 \ \lambda_{2}^{2} - 5481 \ \lambda_{2}^{3} + 1638 \ \lambda_{2}^{4} - 108 \ \lambda_{2}^{5}\right) + \lambda_{2}^{2} \left(-793 + 3757 \ \lambda_{2} - 5640 \ \lambda_{2}^{2} + 2988 \ \lambda_{2}^{3} - 432 \ \lambda_{2}^{4}\right) + \lambda_{2}^{2} \left(-793 + 3757 \ \lambda_{2} - 5640 \ \lambda_{2}^{2} + 2988 \ \lambda_{2}^{3} - 432 \ \lambda_{2}^{4}\right) + \lambda_{2}^{2} \left(-793 + 3757 \ \lambda_{2} - 5640 \ \lambda_{2}^{2} + 2988 \ \lambda_{2}^{3} - 432 \ \lambda_{2}^{4}\right) + \lambda_{2}^{2} \left(-793 + 3757 \ \lambda_{2} - 5640 \ \lambda_{2}^{2} + 1638 \ \lambda_{2}^{4} - 108 \ \lambda_{2}^{4}\right) + \lambda_{2}^{2} \left(-793 + 3757 \ \lambda_{2} - 5640 \ \lambda_{2}^{2} + 1638 \ \lambda_{2}^{4} + 163
                                                                                                                 \lambda_1 \left( -266 + 1818 \,\lambda_2 - 4295 \,\lambda_2^2 + 4453 \,\lambda_2^3 - 2031 \,\lambda_2^4 + 324 \,\lambda_2^5 \right) + 4 \,\alpha_0 \left( 2 - 9 \,\lambda_1 + 9 \,\lambda_1^2 \right) \left( -2 + 3 \,\lambda_2 \right)
                                                                                                                                   \left(4 \,\, \lambda_{1}^{5} + 24 \,\, \lambda_{1}^{4} \,\, \left(-1 + \lambda_{2}\right) \,\, + \,\, \lambda_{1}^{3} \,\, \left(55 - 116 \,\, \lambda_{2} + 56 \,\, \lambda_{2}^{2}\right) \,\, + \,\, \left(1 - 2 \,\, \lambda_{2}\right)^{\,2} \,\, \left(-6 + 13 \,\, \lambda_{2} - 9 \,\, \lambda_{2}^{2} + 2 \,\, \lambda_{2}^{3}\right) \,\, + \,\, \left(1 - 2 \,\, \lambda_{2}\right)^{\,2} \,\, \left(-6 + 13 \,\, \lambda_{2} - 9 \,\, \lambda_{2}^{2} + 2 \,\, \lambda_{2}^{3}\right) \,\, + \,\, \left(1 - 2 \,\, \lambda_{2}\right)^{\,2} \,\, \left(-6 + 13 \,\, \lambda_{2} - 9 \,\, \lambda_{2}^{2} + 2 \,\, \lambda_{2}^{3}\right) \,\, + \,\, \left(1 - 2 \,\, \lambda_{2}\right)^{\,2} \,\, \left(-6 + 13 \,\, \lambda_{2} - 9 \,\, \lambda_{2}^{2} + 2 \,\, \lambda_{2}^{3}\right) \,\, + \,\, \left(1 - 2 \,\, \lambda_{2}\right)^{\,2} \,\, \left(-6 + 13 \,\, \lambda_{2} - 9 \,\, \lambda_{2}^{2} + 2 \,\, \lambda_{2}^{3}\right) \,\, + \,\, \left(1 - 2 \,\, \lambda_{2}\right)^{\,2} \,\, \left(-6 + 13 \,\, \lambda_{2} - 9 \,\, \lambda_{2}^{2} + 2 \,\, \lambda_{2}^{3}\right) \,\, + \,\, \left(1 - 2 \,\, \lambda_{2}\right)^{\,2} \,\, \left(-6 + 13 \,\, \lambda_{2} - 9 \,\, \lambda_{2}^{2} + 2 \,\, \lambda_{2}^{3}\right) \,\, + \,\, \left(1 - 2 \,\, \lambda_{2}\right)^{\,2} \,\, \left(-6 + 13 \,\, \lambda_{2} - 9 \,\, \lambda_{2}^{2} + 2 \,\, \lambda_{2}^{3}\right) \,\, + \,\, \left(1 - 2 \,\, \lambda_{2}\right)^{\,2} \,\, \left(-6 + 13 \,\, \lambda_{2} - 9 \,\, \lambda_{2}^{2} + 2 \,\, \lambda_{2}^{3}\right) \,\, + \,\, \left(1 - 2 \,\, \lambda_{2}\right)^{\,2} \,\, \left(-6 + 13 \,\, \lambda_{2} - 9 \,\, \lambda_{2}^{2} + 2 \,\, \lambda_{2}^{3}\right) \,\, + \,\, \left(1 - 2 \,\, \lambda_{2}\right)^{\,2} \,\, \left(-6 + 13 \,\, \lambda_{2} - 9 \,\, \lambda_{2}^{2} + 2 \,\, \lambda_{2}^{3}\right) \,\, + \,\, \left(1 - 2 \,\, \lambda_{2}\right)^{\,2} \,\, \left(-6 + 13 \,\, \lambda_{2} - 9 \,\, \lambda_{2}^{2} + 2 \,\, \lambda_{2}^{3}\right) \,\, + \,\, \left(1 - 2 \,\, \lambda_{2}\right)^{\,2} \,\, \left(-6 + 13 \,\, \lambda_{2} - 9 \,\, \lambda_{2}^{2} + 2 \,\, \lambda_{2}^{3}\right) \,\, + \,\, \left(1 - 2 \,\, \lambda_{2}\right)^{\,2} \,\, \left(-6 + 13 \,\, \lambda_{2} - 9 \,\, \lambda_{2}^{2} + 2 \,\, \lambda_{2}^{3}\right) \,\, + \,\, \left(1 - 2 \,\, \lambda_{2}\right)^{\,2} \,\, \left(-6 + 13 \,\, \lambda_{2} - 9 \,\, \lambda_{2}^{2} + 2 \,\, \lambda_{2}^{3}\right) \,\, + \,\, \left(1 - 2 \,\, \lambda_{2}\right)^{\,2} \,\, \left(-6 + 13 \,\, \lambda_{2} - 9 \,\, \lambda_{2}^{2} + 2 \,\, \lambda_{2}^{3}\right) \,\, + \,\, \left(1 - 2 \,\, \lambda_{2}\right)^{\,2} \,\, \left(-6 + 13 \,\, \lambda_{2} - 9 \,\, \lambda_{2}^{2} + 2 \,\, \lambda_{2}^{3}\right) \,\, + \,\, \left(1 - 2 \,\, \lambda_{2}\right)^{\,2} \,\, \left(-6 + 13 \,\, \lambda_{2} - 9 \,\, \lambda_{2}^{2} + 2 \,\, \lambda_{2}^{3}\right) \,\, + \,\, \left(1 - 2 \,\, \lambda_{2}\right)^{\,2} \,\, \left(-6 + 13 \,\, \lambda_{2} - 9 \,\, \lambda_{2}^{2} + 2 \,\, \lambda_{2}^{2}\right) \,\, + \,\, \left(1 - 2 \,\, \lambda_{2}\right)^{\,2} \,\, \left(-6 + 13 \,\, \lambda_{2} - 9 \,\, \lambda_{2}^{2} + 2 \,\, \lambda_{2}^{2}\right) \,\, + \,\, \left(1 - 2 \,\, \lambda_{2}\right)^{\,2} \,\, \left(-6 + 13 \,\, \lambda_{2} - 9 \,\, \lambda_{2}^{2} + 2 \,\, \lambda_{2}^{2}\right) \,\, + \,\, \left(1 - 2 \,\, \lambda_{2}\right)^{\,2} \,\, \left(-6 
                                                                                                                                                                      4 \lambda_1^2 \left(-15 + 50 \lambda_2 - 51 \lambda_2^2 + 16 \lambda_2^3\right) + \lambda_1 \left(31 - 145 \lambda_2 + 235 \lambda_2^2 - 156 \lambda_2^3 + 36 \lambda_2^4\right)\right)\right)
                                                    \left( \ \left( \ -2 + \lambda_1 + \lambda_2 \right)^{\ 2} \ \left( -1 + \lambda_1 + \lambda_2 \right)^{\ 2} \ \left( -3 + 2 \ \lambda_1 + 2 \ \lambda_2 \right) \ \left( -1 + 2 \ \lambda_1 + 2 \ \lambda_2 \right) \ \left( -5 + 3 \ \lambda_1 + 3 \ \lambda_2 \right) \right) \ \left( -1 + 2 \ \lambda_1 + 2 \ \lambda_2 \right) \ \left( -1 + 2 \ \lambda_1 + 2 \ \lambda_2 \right) \ \left( -1 + 2 \ \lambda_1 + 2 \ \lambda_2 \right) \ \left( -1 + 2 \ \lambda_1 + 2 \ \lambda_2 \right) \ \left( -1 + 2 \ \lambda_1 + 2 \ \lambda_2 \right) \ \left( -1 + 2 \ \lambda_1 + 2 \ \lambda_2 \right) \ \left( -1 + 2 \ \lambda_1 + 2 \ \lambda_2 \right) \ \left( -1 + 2 \ \lambda_1 + 2 \ \lambda_2 \right) \ \left( -1 + 2 \ \lambda_1 + 2 \ \lambda_2 \right) \ \left( -1 + 2 \ \lambda_1 + 2 \ \lambda_2 \right) \ \left( -1 + 2 \ \lambda_1 + 2 \ \lambda_2 \right) \ \left( -1 + 2 \ \lambda_1 + 2 \ \lambda_2 \right) \ \left( -1 + 2 \ \lambda_1 + 2 \ \lambda_2 \right) \ \left( -1 + 2 \ \lambda_1 + 2 \ \lambda_2 \right) \ \left( -1 + 2 \ \lambda_1 + 2 \ \lambda_2 \right) \ \left( -1 + 2 \ \lambda_1 + 2 \ \lambda_2 \right) \ \left( -1 + 2 \ \lambda_1 + 2 \ \lambda_2 \right) \ \left( -1 + 2 \ \lambda_1 + 2 \ \lambda_2 \right) \ \left( -1 + 2 \ \lambda_1 + 2 \ \lambda_2 \right) \ \left( -1 + 2 \ \lambda_1 + 2 \ \lambda_2 \right) \ \left( -1 + 2 \ \lambda_1 + 2 \ \lambda_2 \right) \ \left( -1 + 2 \ \lambda_1 + 2 \ \lambda_2 \right) \ \left( -1 + 2 \ \lambda_1 + 2 \ \lambda_2 \right) \ \left( -1 + 2 \ \lambda_1 + 2 \ \lambda_2 \right) \ \left( -1 + 2 \ \lambda_1 + 2 \ \lambda_2 \right) \ \left( -1 + 2 \ \lambda_1 + 2 \ \lambda_2 \right) \ \left( -1 + 2 \ \lambda_1 + 2 \ \lambda_2 \right) \ \left( -1 + 2 \ \lambda_1 + 2 \ \lambda_2 \right) \ \left( -1 + 2 \ \lambda_1 + 2 \ \lambda_2 \right) \ \left( -1 + 2 \ \lambda_1 + 2 \ \lambda_2 \right) \ \left( -1 + 2 \ \lambda_1 + 2 \ \lambda_2 \right) \ \left( -1 + 2 \ \lambda_1 + 2 \ \lambda_2 \right) \ \left( -1 + 2 \ \lambda_1 + 2 \ \lambda_2 \right) \ \left( -1 + 2 \ \lambda_1 + 2 \ \lambda_2 \right) \ \left( -1 + 2 \ \lambda_1 + 2 \ \lambda_2 \right) \ \left( -1 + 2 \ \lambda_1 + 2 \ \lambda_2 \right) \ \left( -1 + 2 \ \lambda_1 + 2 \ \lambda_2 \right) \ \left( -1 + 2 \ \lambda_1 + 2 \ \lambda_2 \right) \ \left( -1 + 2 \ \lambda_1 + 2 \ \lambda_2 \right) \ \left( -1 + 2 \ \lambda_1 + 2 \ \lambda_2 \right) \ \left( -1 + 2 \ \lambda_1 + 2 \ \lambda_2 \right) \ \left( -1 + 2 \ \lambda_1 + 2 \ \lambda_2 \right) \ \left( -1 + 2 \ \lambda_1 + 2 \ \lambda_2 \right) \ \left( -1 + 2 \ \lambda_1 + 2 \ \lambda_2 \right) \ \left( -1 + 2 \ \lambda_1 + 2 \ \lambda_2 \right) \ \left( -1 + 2 \ \lambda_1 + 2 \ \lambda_2 \right) \ \left( -1 + 2 \ \lambda_1 + 2 \ \lambda_2 \right) \ \left( -1 + 2 \ \lambda_1 + 2 \ \lambda_2 \right) \ \left( -1 + 2 \ \lambda_1 + 2 \ \lambda_2 \right) \ \left( -1 + 2 \ \lambda_1 + 2 \ \lambda_2 \right) \ \left( -1 + 2 \ \lambda_1 + 2 \ \lambda_2 \right) \ \left( -1 + 2 \ \lambda_1 + 2 \ \lambda_2 \right) \ \left( -1 + 2 \ \lambda_1 + 2 \ \lambda_2 \right) \ \left( -1 + 2 \ \lambda_1 + 2 \ \lambda_2 \right) \ \left( -1 + 2 \ \lambda_1 + 2 \ \lambda_2 \right) \ \left( -1 + 2 \ \lambda_1 + 2 \ \lambda_2 \right) \ \left( -1 + 2 \ \lambda_1 + 2 \ \lambda_2 \right) \ \left( -1 + 2 \ \lambda_1 + 2 \ \lambda_2 \right) \ \left( -1 + 2 \ \lambda_1 + 2 \ \lambda_2 \right) \ \left( -1 + 2 \ \lambda_1 + 2 \ \lambda_2 \right) \ \left( -1 + 2 \ \lambda_1 + 2 \ \lambda
                                                                                     (-4 + 3 \lambda_1 + 3 \lambda_2) (-2 + 3 \lambda_1 + 3 \lambda_2))
F_4 = C_{00} + C_{10} * \beta_1 + C_{01} * \beta_2 // FullSimplify
```

This shows that F_4 coincides with its 1-jet and so is linear on β_1 , β_2 .

Consider now the linear system $F_3 = 0$, $F_4 = 0$.

True

```
A := \{ \{ Coefficient[F_3, \beta_1, 1], Coefficient[F_3, \beta_2, 1] \}, \{ Coefficient[F_4, \beta_1, 1], Coefficient[F_4, \beta_2, 1] \} \}
```

Again, to show that the determinant of the matrix A is not identically zero it is enough to evaluate it at concrete values of (λ, α) and verify that we obtain a non-zero complex number:

Det[A] /.
$$\{\lambda_1 \to 2 - i, \lambda_2 \to 2 * i, \alpha_0 \to 1, \alpha_1 \to 0, \alpha_2 \to 0\}$$

$$\frac{848896}{325} - \frac{5379072 i}{325}$$

This proves that A is not identically zero with respect to (λ, α) and so proves Proposition 3.3.

This completes the proof of the Elimination Lemma.