

Lemma 3.4

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R.<x1,x2,x3,x4,x5,x6,x7,x8,x9,x10,x11,x12,x13,x14,x15,x16,x17,x18,x19,x20\  
  ,x21,x22,x23,x24,z1,z2,z3,z4,z5>=QQ[];  
  
# define the symbolic matrix M(x)  
  
M = matrix(R,[  
  [ x1, x2, x3, x4, 0, 0, 0, 0, 0],  
  [ 0, 0, 0, 0, x5, x6, x7, x8, z1],  
  [ x9, x10, 0, 0, x11, x12, 0, 0, z2],  
  [ 0, 0, x13, x14, 0, 0, x15, x16, z3],  
  [ x17, 0, x18, 0, x19, 0, x20, 0, z4],  
  [ 0, x21, 0, x22, 0, x23, 0, x24, z5]]); M  
[ x1 x2 x3 x4 0 0 0 0 0]  
[ 0 0 0 0 x5 x6 x7 x8 z1]  
[ x9 x10 0 0 x11 x12 0 0 z2]  
[ 0 0 x13 x14 0 0 x15 x16 z3]  
[x17 0 x18 0 x19 0 x20 0 z4]  
[ 0 x21 0 x22 0 x23 0 x24 z5]  
  
# define the symbolic matrix M'(x)  
  
MM = M.matrix_from_rows_and_columns([0,1,2,3],[0,1,2,3,4,5,6,7]); MM  
[ x1 x2 x3 x4 0 0 0 0]  
[ 0 0 0 0 x5 x6 x7 x8]  
[ x9 x10 0 0 x11 x12 0 0]  
[ 0 0 x13 x14 0 0 x15 x16]  
  
#compute the ideal generated by 5-minors of M(x) and 4-minors of M'(x)  
  
J=ideal(M.minors(5)+ MM.minors(4));  
  
# test the membership of the trinomial x1*x11*x13*x24*z1-x1*x5*x13*x24*z2\  
  -x3*x5*x9*x24*z3 in the ideal  
  
(x1*x11*x13*x24*z1-x1*x5*x13*x24*z2-x3*x5*x9*x24*z3) in J  
True
```