

Corollary 5.12 (Class 3)

June 19, 2015

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# parametrize the slack matrix

R.<x1,x2,x3,x4,x5,x6,x7,x8,x9,x10,x11,x12,x13,x14,x15,x16,x17>=QQ[];

M = matrix(R,[
  [ 0,x1,  0,  0,  0, x2,  0],
  [x3, 0,  0,  0,  0, x4,  0],
  [x5, 0, x6,  0,  0,  0, x7],
  [ 0,x8, x9,  0,  0,  0,x10],
  [ 0, 0,  0,  0,x11,  0,x12],
  [ 0, 0,  0,x13,x14,x15,  0],
  [ 0, 0,x16,x17,  0,  0,  0]]); M

[ 0 x1 0 0 0 x2 0]
[ x3 0 0 0 0 x4 0]
[ x5 0 x6 0 0 0 x7]
[ 0 x8 x9 0 0 0 x10]
[ 0 0 0 0 x11 0 x12]
[ 0 0 0 x13 x14 x15 0]
[ 0 0 x16 x17 0 0 0]

J=ideal(M.minors(6));
for c in J.gens():
  print(c)
-x2*x3*x6*x8*x11*x13 + x1*x4*x5*x9*x11*x13
-x1*x3*x7*x9*x11*x13 + x1*x3*x6*x10*x11*x13
x2*x3*x6*x8*x12*x13 - x1*x4*x5*x9*x12*x13
x2*x3*x6*x8*x12*x14 - x1*x4*x5*x9*x12*x14 + x1*x3*x7*x9*x11*x15 - x1*x3*x6*x10*x11*x15
x2*x3*x7*x8*x11*x13 - x1*x4*x5*x10*x11*x13
x2*x3*x7*x9*x11*x13 - x2*x3*x6*x10*x11*x13
-x1*x4*x7*x9*x11*x13 + x1*x4*x6*x10*x11*x13
-x2*x3*x6*x8*x11*x17 + x1*x4*x5*x9*x11*x17
-x1*x3*x7*x9*x11*x17 + x1*x3*x6*x10*x11*x17
x2*x3*x6*x8*x12*x17 - x1*x4*x5*x9*x12*x17
x2*x3*x7*x8*x11*x16 - x1*x4*x5*x10*x11*x16
x2*x3*x7*x8*x11*x17 - x1*x4*x5*x10*x11*x17
x2*x3*x7*x9*x11*x17 - x2*x3*x6*x10*x11*x17
-x1*x4*x7*x9*x11*x17 + x1*x4*x6*x10*x11*x17
-x2*x3*x6*x8*x14*x17 + x1*x4*x5*x9*x14*x17
-x1*x3*x7*x9*x14*x17 + x1*x3*x6*x10*x14*x17
x2*x3*x7*x8*x13*x16 - x1*x4*x5*x10*x13*x16 - x1*x3*x7*x9*x15*x17 + x1*x3*x6*x10*x15*x17
```

$x_2x_3x_7x_8x_{14}x_{16} - x_1x_4x_5x_{10}x_{14}x_{16}$
 $x_2x_3x_7x_8x_{14}x_{17} - x_1x_4x_5x_{10}x_{14}x_{17}$
 $x_2x_3x_7x_9x_{14}x_{17} - x_2x_3x_6x_{10}x_{14}x_{17}$
 $-x_1x_4x_7x_9x_{14}x_{17} + x_1x_4x_6x_{10}x_{14}x_{17}$
 $x_1x_4x_5x_{11}x_{13}x_{16} - x_1x_3x_6x_{11}x_{15}x_{17}$
 $-x_1x_3x_7x_{11}x_{13}x_{16} + x_1x_3x_6x_{12}x_{14}x_{17}$
 $-x_1x_4x_5x_{12}x_{13}x_{16} + x_1x_3x_6x_{12}x_{15}x_{17}$
 $-x_1x_4x_5x_{12}x_{14}x_{16} + x_1x_3x_7x_{11}x_{15}x_{16}$
 $-x_1x_4x_5x_{12}x_{14}x_{17} + x_1x_3x_7x_{11}x_{15}x_{17}$
 $x_2x_3x_7x_{11}x_{13}x_{16} - x_2x_3x_6x_{12}x_{14}x_{17}$
 $-x_1x_4x_7x_{11}x_{13}x_{16} + x_1x_4x_6x_{12}x_{14}x_{17}$
 $x_2x_3x_8x_{11}x_{13}x_{16} - x_1x_3x_9x_{11}x_{15}x_{17}$
 $-x_1x_3x_{10}x_{11}x_{13}x_{16} + x_1x_3x_9x_{12}x_{14}x_{17}$
 $-x_2x_3x_8x_{12}x_{13}x_{16} + x_1x_3x_9x_{12}x_{15}x_{17}$
 $-x_2x_3x_8x_{12}x_{14}x_{16} + x_1x_3x_{10}x_{11}x_{15}x_{16}$
 $-x_2x_3x_8x_{12}x_{14}x_{17} + x_1x_3x_{10}x_{11}x_{15}x_{17}$
 $x_2x_3x_{10}x_{11}x_{13}x_{16} - x_2x_3x_9x_{12}x_{14}x_{17}$
 $-x_1x_4x_{10}x_{11}x_{13}x_{16} + x_1x_4x_9x_{12}x_{14}x_{17}$
 $x_2x_5x_8x_{11}x_{13}x_{16} - x_1x_5x_9x_{11}x_{15}x_{17}$
 $-x_1x_5x_{10}x_{11}x_{13}x_{16} + x_1x_5x_9x_{12}x_{14}x_{17}$
 $-x_2x_5x_8x_{12}x_{13}x_{16} + x_1x_5x_9x_{12}x_{15}x_{17}$
 $-x_2x_5x_8x_{12}x_{14}x_{16} + x_1x_5x_{10}x_{11}x_{15}x_{16}$
 $-x_2x_5x_8x_{12}x_{14}x_{17} + x_1x_5x_{10}x_{11}x_{15}x_{17}$
 $x_2x_5x_{10}x_{11}x_{13}x_{16} - x_2x_5x_9x_{12}x_{14}x_{17}$
 $-x_2x_7x_8x_{11}x_{13}x_{16} + x_2x_6x_8x_{12}x_{14}x_{17} + x_1x_7x_9x_{11}x_{15}x_{17} -$
 $x_1x_6x_{10}x_{11}x_{15}x_{17}$
 $x_4x_5x_8x_{11}x_{13}x_{16} - x_3x_6x_8x_{11}x_{15}x_{17}$
 $-x_3x_7x_8x_{11}x_{13}x_{16} + x_3x_6x_8x_{12}x_{14}x_{17}$
 $-x_4x_5x_8x_{12}x_{13}x_{16} + x_3x_6x_8x_{12}x_{15}x_{17}$
 $-x_4x_5x_8x_{12}x_{14}x_{16} + x_3x_7x_8x_{11}x_{15}x_{16}$
 $-x_4x_5x_8x_{12}x_{14}x_{17} + x_3x_7x_8x_{11}x_{15}x_{17}$
 $x_4x_5x_{10}x_{11}x_{13}x_{16} - x_4x_5x_9x_{12}x_{14}x_{17} + x_3x_7x_9x_{11}x_{15}x_{17} -$
 $x_3x_6x_{10}x_{11}x_{15}x_{17}$
 $-x_4x_7x_8x_{11}x_{13}x_{16} + x_4x_6x_8x_{12}x_{14}x_{17}$

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JJ = ideal(x1*x2*x3*x4*x5*x6*x7*x8*x9*x10*x11*x12*x13*x14*x15*x16*x17);
KK = J.saturation(JJ);
for c in KK[0].gens():
    print(c)

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$x_7x_9 - x_6x_{10}$
 $x_{10}x_{11}x_{13}x_{16} - x_9x_{12}x_{14}x_{17}$
 $x_7x_{11}x_{13}x_{16} - x_6x_{12}x_{14}x_{17}$
 $x_2x_8x_{13}x_{16} - x_1x_9x_{15}x_{17}$
 $x_4x_5x_{13}x_{16} - x_3x_6x_{15}x_{17}$
 $x_2x_8x_{12}x_{14} - x_1x_{10}x_{11}x_{15}$
 $x_4x_5x_{12}x_{14} - x_3x_7x_{11}x_{15}$
 $x_2x_3x_7x_8 - x_1x_4x_5x_{10}$
 $x_2x_3x_6x_8 - x_1x_4x_5x_9$