**Solving systems of equations – with Sage**

M=MatrixSpace(QQ,3)

|  |  |
| --- | --- |
|          |  |

I=M([1,0,0,0,1,0,0,0,1]); I

|  |  |
| --- | --- |
|          | [1 0 0][0 1 0][0 0 1] |
|  |  |

MC=MatrixSpace(QQ,3,1)

b=MC([0,1,0]); b

|  |  |
| --- | --- |
|          | [0][1][0] |

# Working on problem 14a in Rorres section 1.6

|  |  |
| --- | --- |
|          |  |

A=M([1,3,5,-1,2,0,2,5,4]); A

|  |  |
| --- | --- |
|          | [ 1 3 5][-1 2 0][ 2 5 4] |

C=A\b; C

|  |  |
| --- | --- |
|          | [-13/25][ 6/25][ -1/25] |

C1=A.solve\_right(b); C1

|  |  |
| --- | --- |
|          | [-13/25][ 6/25][ -1/25] |

C2=A.augment(b) C2

|  |  |
| --- | --- |
|          | [ 1 3 5 0][-1 2 0 1][ 2 5 4 0] |

C2.echelon\_form()

|  |  |
| --- | --- |
|          | [ 1 0 0 -13/25][ 0 1 0 6/25][ 0 0 1 -1/25] |

A\_inv=A.inverse() A\_inv

|  |  |
| --- | --- |
|          | [ -8/25 -13/25 2/5][ -4/25 6/25 1/5][ 9/25 -1/25 -1/5] |

C3=A\_inv\*b C3

|  |  |
| --- | --- |
|          | [-13/25][ 6/25][ -1/25] |

C4=A.augment(I) C4

|  |  |
| --- | --- |
|          | [ 1 3 5 1 0 0][-1 2 0 0 1 0][ 2 5 4 0 0 1] |

C4.echelon\_form()

|  |  |
| --- | --- |
|          | [ 1 0 0 -8/25 -13/25 2/5][ 0 1 0 -4/25 6/25 1/5][ 0 0 1 9/25 -1/25 -1/5] |

#Notice that the result above is I | A\_inv

#Notice that we can get the solution to Ax = b as C, or C1, or the rightmost column of
#C2.echelon\_form() or C3

|  |  |
| --- | --- |
|          |  |