HW1.10

Philip

Compute the eigenvalues and eigenvectors for the following matrix using ye olde proverbally pencil and paper

```
from sympy import *
A = Matrix([[3.4109, -0.2693, -1.0643],[1.5870, 1.5546, -5.5361],[0.2981, -0.2981, 1.2277]])
I = Matrix([[1,0,0],[0,1,0],[0,0,1]])
eVals = A.eigenvals()
eVects = A.eigenvects()
pprint(A)
# A matrix
```

```
## [3.4109  -0.2693  -1.0643]
## [                        ]
## [1.587   1.5546   -5.5361]
## [                        ]
## [0.2981  -0.2981  1.2277 ]
```

```
for val in list(eVals.keys()):
    print(val.evalf())
# Eigen Values
```

```
## 3.14160000000000
## 0.333362500589654
## 2.71823749941035
```

```
pprint(eVects)
# Eigen Vectors
```

```
##               [1.0]
##               [   ]
## [(3.1416, 1, [[1.0]]),
##               [   ]
##               [ 0 ]
##
##                         [0.666693567376375]
##                         [                 ]
## (0.333362500589654, 1, [[3.66681936211085 ]]),
##                         [                 ]
##                         [       1.0       ]
##
##                        [-0.666648265089379]
##                        [                  ]
## (2.71823749941035, 1, [[-5.66677405982385 ]])]
##                        [                  ]
##                        [       1.0        ]
```

```
for val in list(eVals.keys()):
    print("------------------------------------------------------------")
    eig = val.evalf()
    m = A-I*eig
    print(eig)
    pprint(m)
    pprint(m.rref())
# A-I*eig Matricies
```

```
## ------------------------------------------------------------
## 3.14160000000000
## [0.2693  -0.2693  -1.0643]
## [                        ]
## [1.587   -1.587   -5.5361]
## [                        ]
## [0.2981  -0.2981  -1.9139]
##  [1  0  0]
##  [       ]
## ([0  1  0], (0, 1, 2))
##  [       ]
##  [0  0  1]
## ------------------------------------------------------------
## 0.333362500589654
## [3.07753749941035      -0.2693            -1.0643     ]
## [                                                     ]
## [     1.587        1.22123749941035       -5.5361     ]
## [                                                     ]
## [     0.2981           -0.2981       0.894337499410346]
##  [1  0  -0.666693567376375]
##  [                        ]
## ([0  1  -3.66681936211085 ], (0, 1))
##  [                        ]
##  [0  0          0         ]
## ------------------------------------------------------------
## 2.71823749941035
## [0.692662500589653       -0.2693            -1.0643     ]
## [                                                       ]
## [      1.587        -1.16363749941035       -5.5361     ]
## [                                                       ]
## [     0.2981             -0.2981       -1.49053749941035]
##  [1  0  0]
##  [       ]
## ([0  1  0], (0, 1, 2))
##  [       ]
##  [0  0  1]
```