```
#
#
#
#
#
#
#
from casadi import *
import numpy

A = diagcat(1,DM([[2,3],[3,4]]),DM([[5,6,7],[6,8,9],[7,9,10]]),11)
print A
```

```
[[1, 00, 00, 00, 00, 00, 00],
 [00, 2, 3, 00, 00, 00, 00],
 [00, 3, 4, 00, 00, 00, 00],
 [00, 00, 00, 5, 6, 7, 00],
 [00, 00, 00, 6, 8, 9, 00],
 [00, 00, 00, 7, 9, 10, 00],
 [00, 00, 00, 00, 00, 00, 11]]
```

```
A.sparsity().spy()
```

```
*.....
.**....
.**....
...***.
...***.
...***.
......*
```

```

numpy.random.seed(2)

perm =  list(numpy.random.permutation(range(A.size1())))
AP = A[perm,perm]

print AP
```

```
[[8, 00, 6, 00, 00, 9, 00],
 [00, 2, 00, 3, 00, 00, 00],
 [6, 00, 5, 00, 00, 7, 00],
 [00, 3, 00, 4, 00, 00, 00],
 [00, 00, 00, 00, 11, 00, 00],
 [9, 00, 7, 00, 00, 10, 00],
 [00, 00, 00, 00, 00, 00, 1]]
```

```
AP.sparsity().spy()
```

```
*.*..*.
.*.*...
*.*..*.
.*.*...
....*..
*.*..*.
......*
```

```

n,p,r = AP.sparsity().scc()

APrestored = AP[p,p]

print APrestored
```

```
[[8, 6, 9, 00, 00, 00, 00],
 [6, 5, 7, 00, 00, 00, 00],
 [9, 7, 10, 00, 00, 00, 00],
 [00, 00, 00, 2, 3, 00, 00],
 [00, 00, 00, 3, 4, 00, 00],
 [00, 00, 00, 00, 00, 11, 00],
 [00, 00, 00, 00, 00, 00, 1]]
```

```
APrestored.sparsity().spy()
```

```
***....
***....
***....
...**..
...**..
.....*.
......*
```

```
print "# blocks: ", n
```

```
# blocks:  4
```

```
print "block boundaries: ", r[:n]
```

```
block boundaries:  [0, 3, 5, 6]
```