POD,DMD, SINDY

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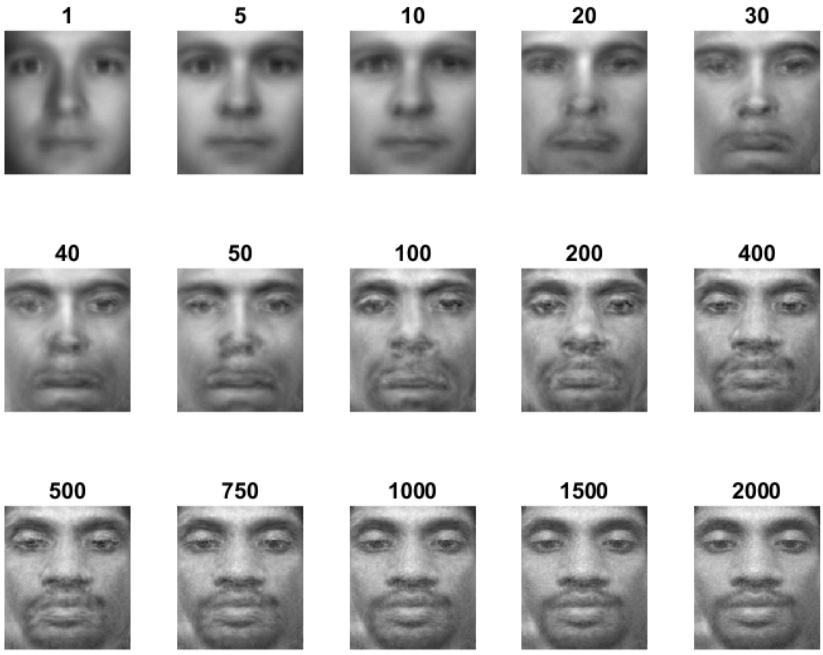
2. POD:

Input image:

My Face

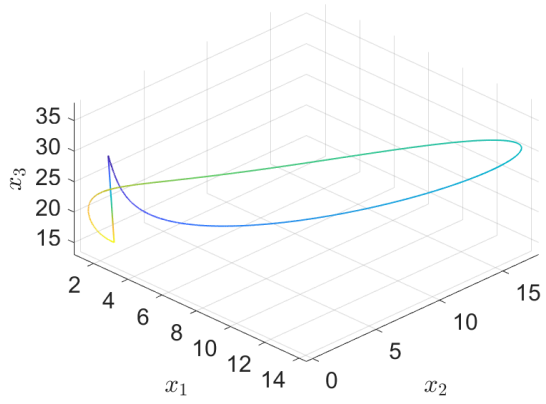
Reconstruction based on number of eigenvectors:



We can see that at around 400 basis faces, we can see the input image. On further addition of information from the other vectors we get lesser noise and a clearer output of the input image.

SINDy:

The data plotted:



When we set the sparsity parameter to zero, we get the following function approximation:

```
Discovered model using SINDy(sparsity set to zero):

dx/dt = - -1.1405e-05 - -10x + 10y
dy/dt = + 28x - -0.999976y - -0.999999xz
dz/dt = - -0.000106264 - -4.64983e-05x + 4.0588e-05y - -2.66666z + 1xy
>>
```

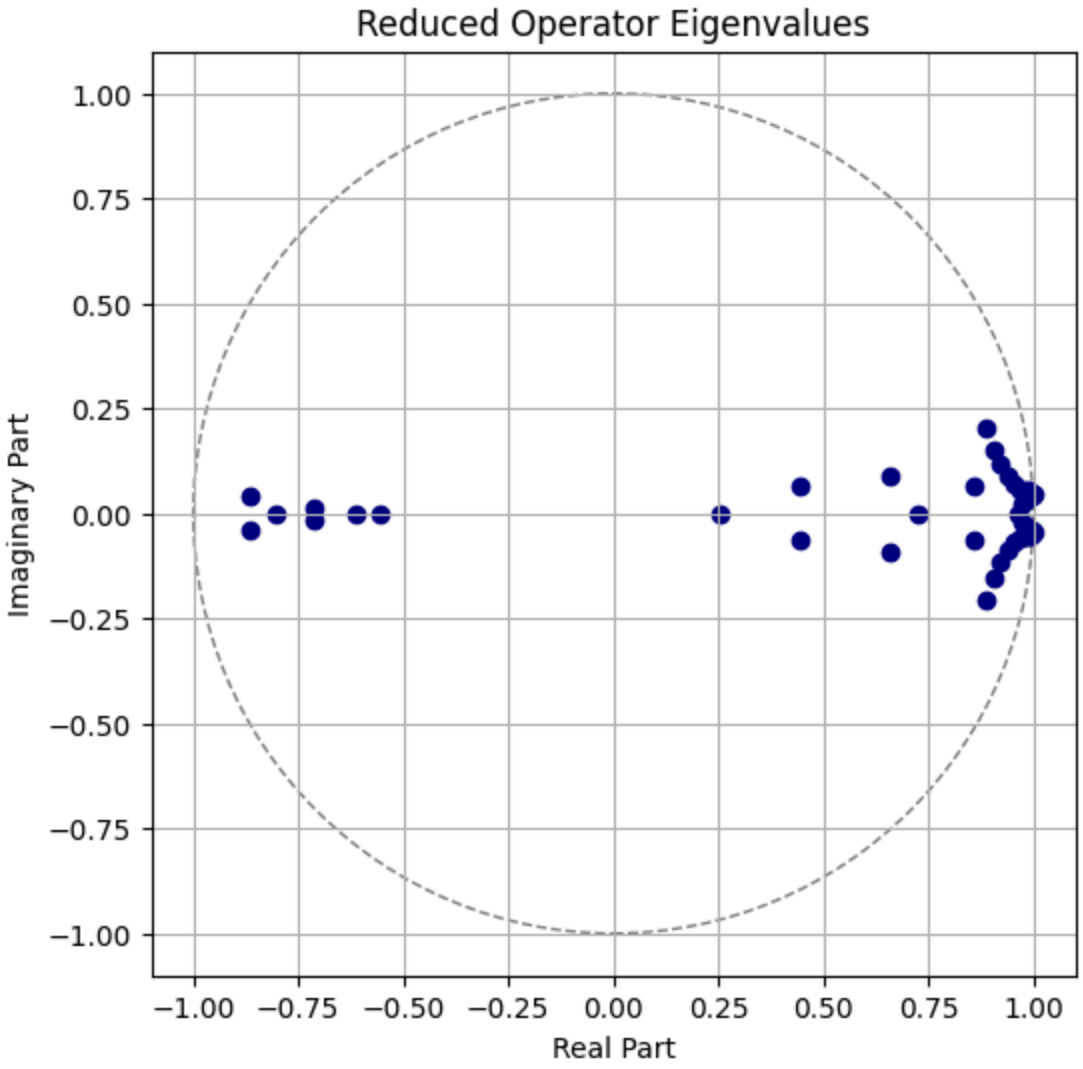
When we set sparsity parameter to 0.1, we get the following function:

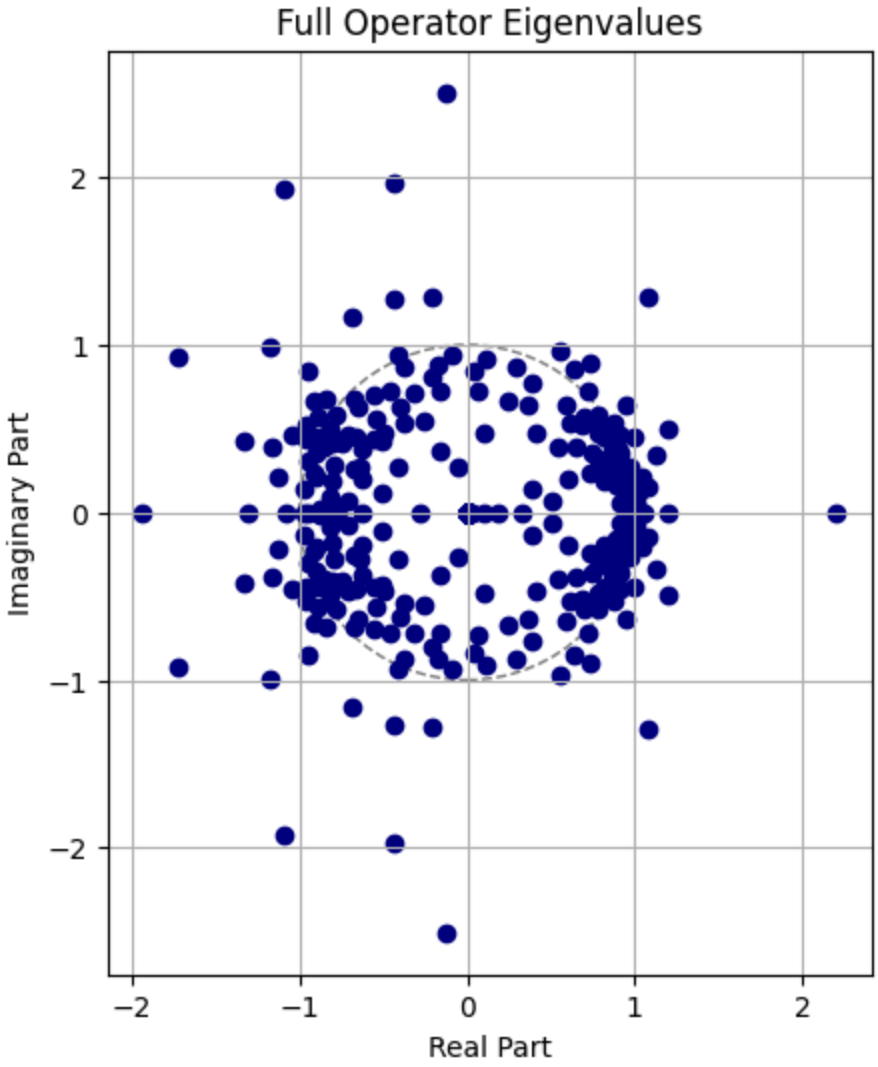
```
Discovered model using SINDy:

dx/dt = - -10x + 10y
dy/dt = + 28x - -0.999997y - -1xz
dz/dt = - -2.66667z + 1xy
>>
```

This function best approximates the given data and carries the significant terms.

DMD:


Reduced Operator Eigenvalues
Imaginary Part
Real Part
1.00
0.75
0.50
0.25
0.00
−0.25
−0.50
−0.75
−1.00
−1.00
−0.75
−0.50
−0.25
0.00
0.25
0.50
0.75
1.00


Full Operator Eigenvalues
Imaginary Part
Real Part
2
1
0
−1
−2
−2
−1
0
1
2