Custom SVD Implementation

Input Matrix - X

Output:

- U: Matrix of eigenvectors of (X * X')
- V: Matrix of eigenvectors of (X' * X)
- S: svd of X

Negative error correction

```
S = U' * X * V;

[Sr, Sc] = size(S);
for i = 1:min(Sr, Sc)
    if (S(i, i) < 0)
        V(:, i) = -1*V(:, i);
    end
end

S = U' * X * V;
```

Testing

Case 1

```
X = [1];
[U, S, V] = mySVD(X);
[Uo, So, Vo] = svd(X);

display(S);
display(So);
```

```
S =

     1


So =

     1
```

Case 2

```
X = [1 2 4];
[U, S, V] = mySVD(X);
[Uo, So, Vo] = svd(X);
display(S);
```

```
display(So);
```

```
S =

    4.5826         0   -0.0000
```

```
So =

    4.5826         0         0
```

Case 3

```
X = [1 2 4; 0 3 6];
[U, S, V] = mySVD(X);
[Uo, So, Vo] = svd(X);
display(S);
display(So);
```

```
S =

    8.0815   -0.0000    0.0000
   -0.0000    0.8301    0.0000
```

```
So =

    8.0815         0         0
         0    0.8301         0
```

Case 4

```
X = [1 2 4; 0 3 6; 9 1 5];
[U, S, V] = mySVD(X);
[Uo, So, Vo] = svd(X);
display(S);
display(So);
```

```
S =

   11.6513   -0.0000   -0.0000
    0.0000    6.1017   -0.0000
    0.0000    0.0000    0.1266
```

```
So =

   11.6513         0         0
         0    6.1017         0
         0         0    0.1266
```

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