1

```
octave> t=(0:0.01:8*pi)';  N=max(size(t));
octave> o=ones(N,1); z=zeros(N,1); x=-sin(t); xd=-cos(t);
octave> A1=[o x xd]; rank(A1)
```

3

```
octave> A2=[o x xd x.*x x.*xd xd.*xd]; rank(A2)
```

5

```
octave> [Q, R, P]=qr(A2);
octave> Q5=Q(:,1:5); R5=R(1:5,1:5);
octave> null(A2)
```

$$\begin{pmatrix} 0.57735 \\ 0.0 \\ 0.0 \\ -0.57735 \\ 0.0 \\ -0.57735 \end{pmatrix}$$

```
octave>
```