sphspectrum

Purpose

Plot the spectral set for a spherical polynomial family.

Syntax

```
sphspectrum(p0,r)
sphspectrum(p0,r,x,y)
sphspectrum(...,'fill');
```

Description

`sphspectrum(p0,r)` plots the spectral set for a spherical polynomial family

$$p(s,\mathbf{q}) = p_0(s) + \sum_{i=0}^{n} q_i s^i$$

where $\|\mathbf{q}\|_2 \le r$ for a range of values of the parameter `r`.

`sphspectrum(p0,r,x,y)` The parameters `x` and `y` are vectors of (real) values at real and imaginary axes for which the gridding is performed.

`sphspectrum(...,'fill')` fills the contours describing the spectral set.

Examples

The nominal polynomial $p_0(s)$ is

```
p0 = s^6 + 2*s^5 + 3*s^4 + 4*s^3 + 5*s^2 + 6*s + 7;
```

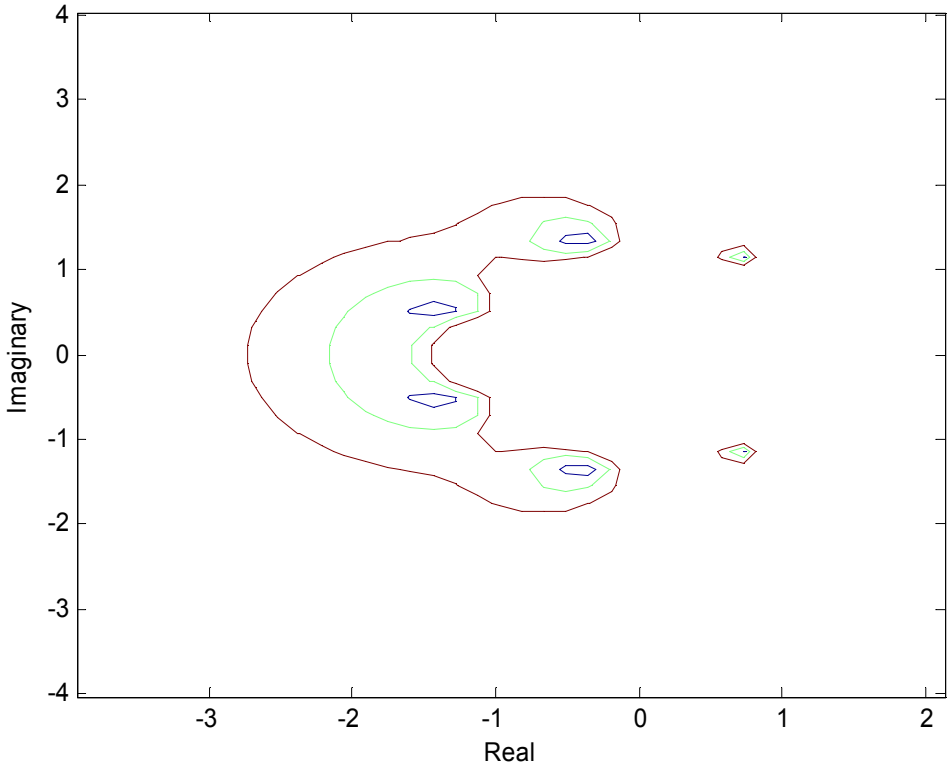
The vector of bounds on the Euclidean norm of the uncertain parameter **q** is

```
r = [0.3 0.6 0.9];
```

The spectral set (set of roots of the uncertain polynomial) can be visualized as

```
sphspectrum(p0,r)
```

sphspectrum



To supply your own tighter and denser grid, choose

```
x = -3:0.02:1;
```

for the real axis and

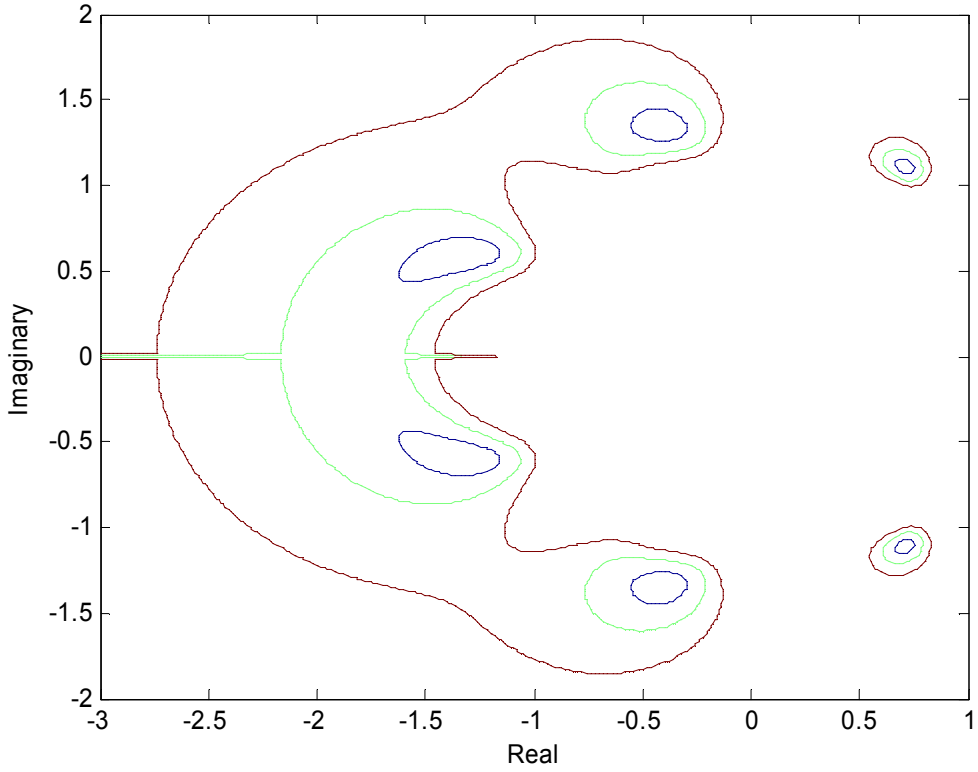
```
y = -2:0.02:2;
```

for the imaginary axis.

*(note that s = x +j*y)*

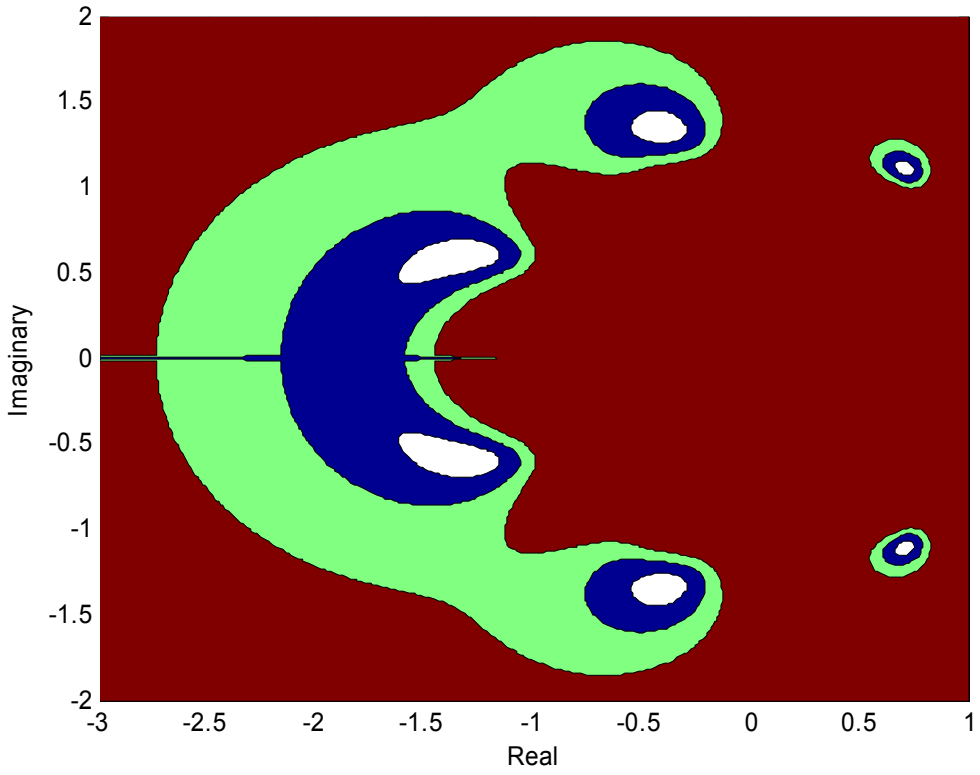
The spectral set (set of roots of the uncertain polynomial) can be visualized as

```
sphspecsetplot(p0,r,x,y)
```



sphspectrum

```
sphspectrum(p0,r,x,y,'fill')
```



See also

`spherplot`	value set plotting for a spherical polynomial family for a grid of frequencies.

References

B.R.Barmish (1994). New Tools for Robustness of Linear Systems, Macmillan, pp.281.