Plot Signal Constellations

Create 16-PSK Constellation Diagram

This example shows how to plot a PSK constellation having 16 points.

Set the parameters for 16-PSK modulation with no phase offset and binary symbol mapping.

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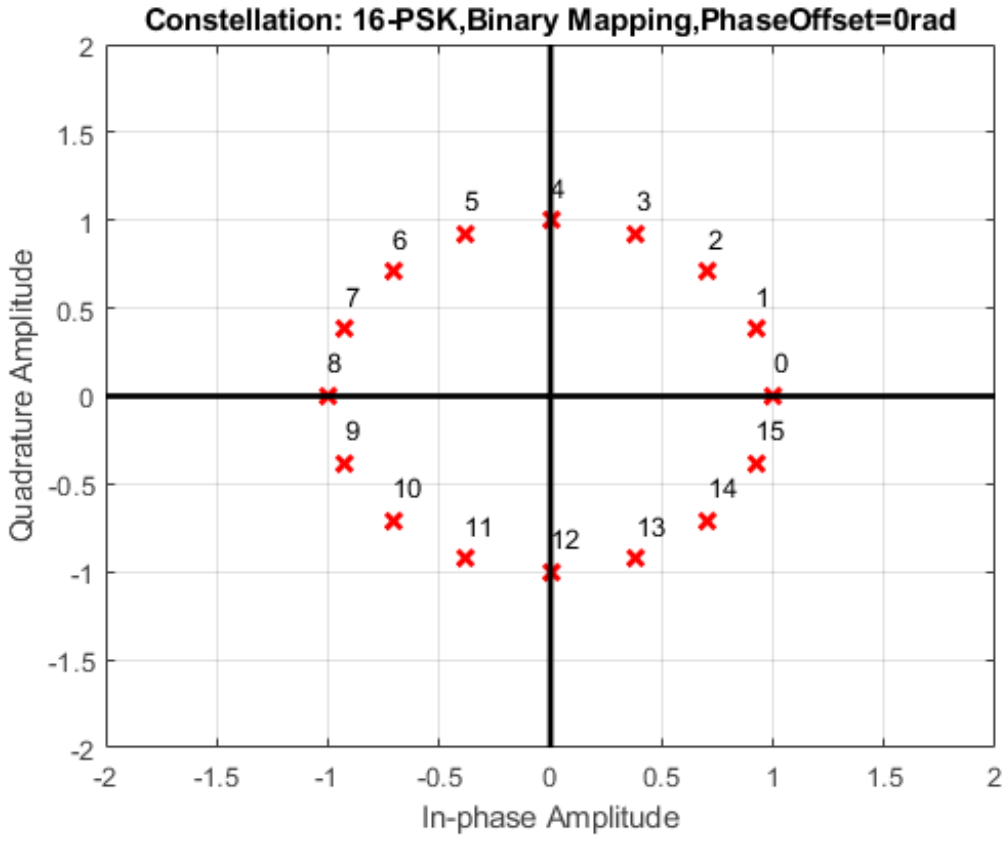
```
M = 16;              % Modulation alphabet size
phOffset = 0;        % Phase offset
symMap = 'binary';   % Symbol mapping (either 'binary' or 'gray')
```

Construct the modulator object.

```
pskModulator = comm.PSKModulator(M,phOffset,'SymbolMapping',symMap);
```

Plot the constellation.

```
constellation(pskModulator)
```



Create 32-QAM Constellation Diagram

This example shows how to plot a QAM constellation having 32 points.

Use the `qammod` function to generate the 32-QAM symbols with binary symbol ordering.

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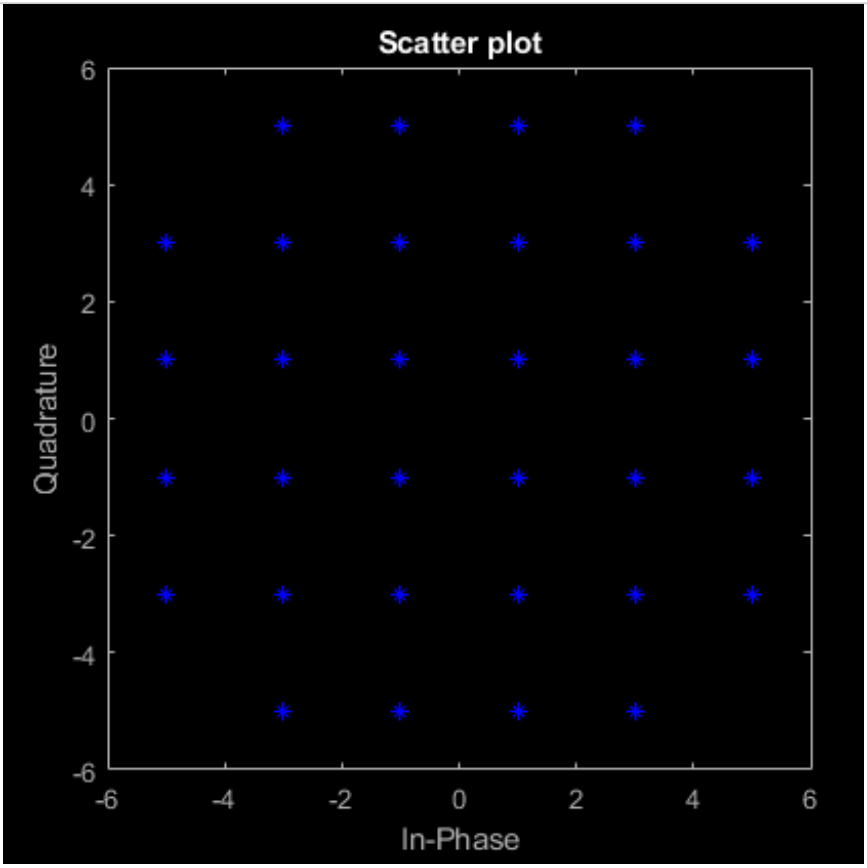
```
M = 32;
data = 0:M-1;
sym = qammod(data,M,'bin');
```

Plot the constellation. Label the order of the constellation symbols.

```
scatterplot(sym,1,0,'b*');
for k = 1:M
    text(real(sym(k))-0.4,imag(sym(k))+0.4,num2str(data(k)));
end
axis([-6 6 -6 6])
```



Create 8-QAM Gray Coded Constellation Diagram

Use the qammod function to generate the 8-QAM symbols with Gray symbol ordering. Note that Gray coding is the default symbol mapping for the qammod function.

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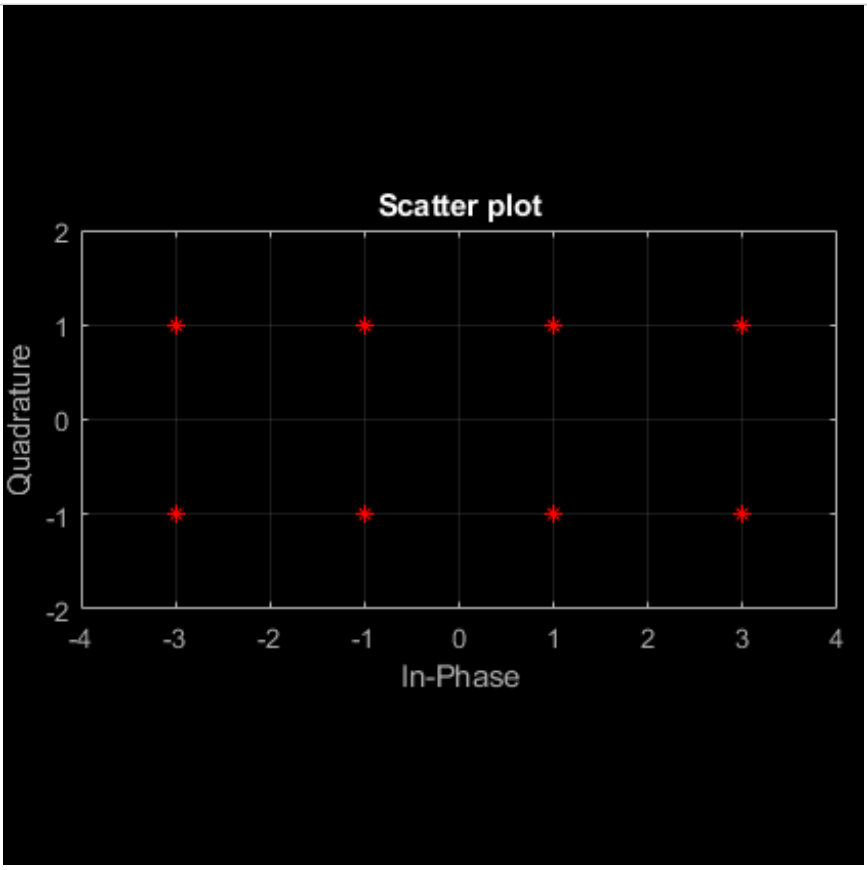
```
M = 8;
data = 0:M-1;
sym = qammod(data,M);
```

Plot the constellation. Label the order of the constellation symbols.

```
scatterplot(sym,1,0,'r*');
grid on
for k = 1:M
    text(real(sym(k))-0.4,imag(sym(k))+0.4,num2str(data(k)));
```

```
end
axis([-4 4 -2 2])
```



Plot a Triangular Constellation for QAM

This example shows how to plot a customized QAM reference constellation.

Describe the constellation.

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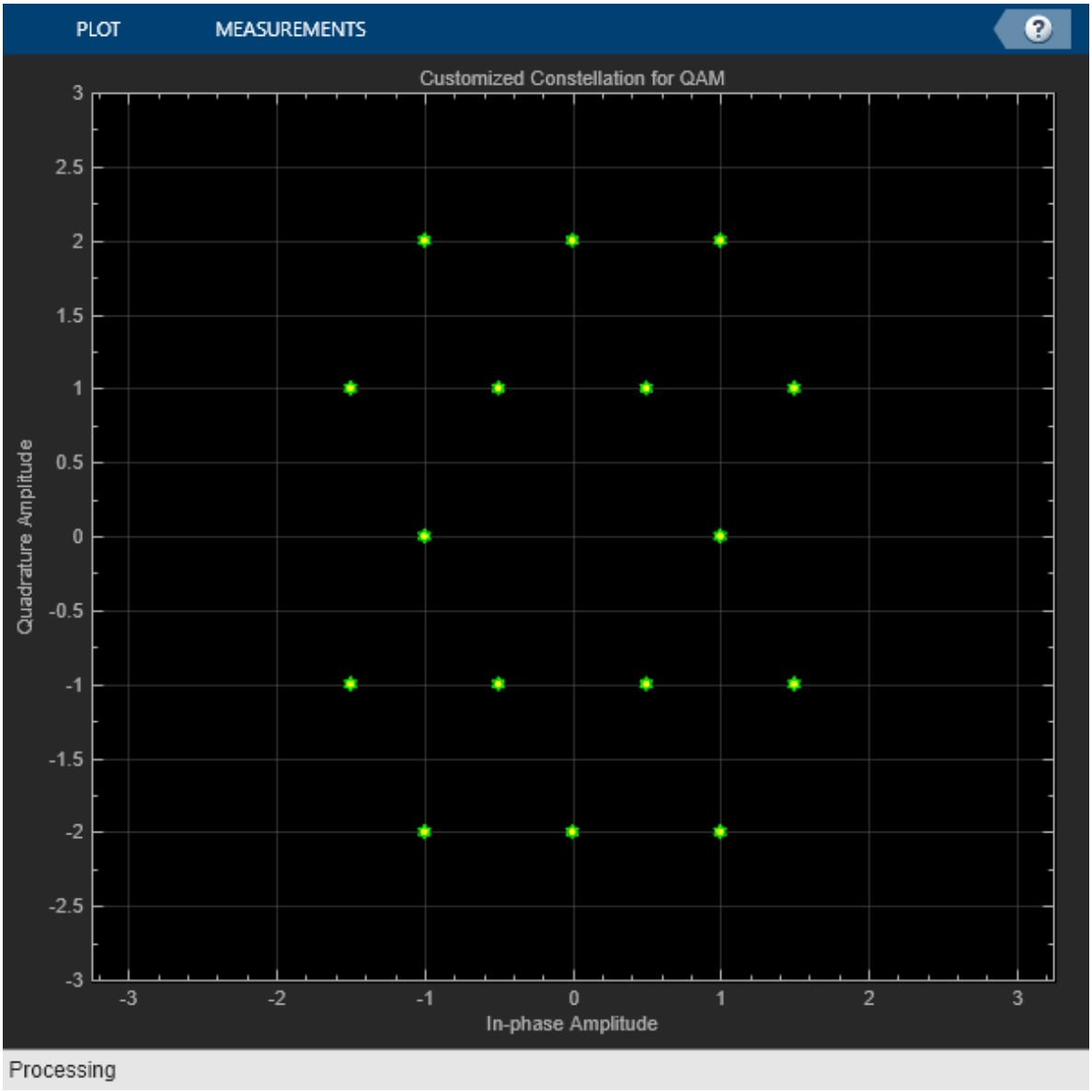
```
inphase = [1/2 -1/2 1 0 3/2 -3/2 1 -1];
quadr = [1 1 0 2 1 1 2 2];
inphase = [inphase; -inphase];
inphase = inphase(:);
quadr = [quadr; -quadr];
quadr = quadr(:);
refConst = inphase + 1i*quadr;
```

Construct a constellation diagram System object™ using name-value pairs to specify the title, the axes limits, the reference marker type, and the reference marker color.

```
constDiagram = comm.ConstellationDiagram('Title','Customized Constellation for QAM', ...
    'XLimits',[-3 3],'YLimits',[-3 3], ...
    'ReferenceConstellation',refConst, ...
    'ReferenceMarker','*','ReferenceColor',[0 1 0]);
```

Plot the customized constellation.

```
constDiagram(refConst)
```



See Also

View Constellation of Modulator Block