```
function p = patchline(xs,ys,varargin(
 %Plot lines as patches (efficiently(
%
 %SYNTAX:
    %patchline(xs,ys(
    %patchline(xs,ys,zs(...,
    %patchline(xs,ys,zs,'PropertyName',propertyvalue(...,
    %p = patchline(...)
%
 %PROPERTIES :
    %Accepts all parameter-values accepted by PATCH.
 %
 %DESCRIPTION:
    %p = patchline(xs,ys,zs,'PropertyName',propertyvalue(...,
        %Takes a vector of x-values (xs) and a same-sized
        %vector of y-values (ys). z-values (zs) are
        %supported, but optional; if specified, zs must
        %occupy the third input position. Takes all P-V
        %pairs supported by PATCH. Returns in p the handle
        %to the resulting patch object.
        %
 %NOTES:
    %Note that we are drawing 0-thickness patches here,
    %represented only by their edges. FACE PROPERTIES WILL
    %NOT NOTICEABLY AFFECT THESE OBJECTS! (Modify the
    %properties of the edges instead(.
%
    %LINUX (UNIX) USERS: One test-user found that this code
```

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    %worked well on his Windows machine, but crashed his
    %Linux box. We traced the problem to an openGL issue;
    %the problem can be fixed by calling 'opengl software'
    %in your <http://www.mathworks.com/help/techdoc/ref/startup.html startup.m.<
)    %That command is valid at startup, but not at runtime,
    %on a unix machine(.
%
 %EXAMPLES:
 %%%Example 1:
%
 %n = 10;
 %xs = rand(n,1;(
 %ys = rand(n,1;(
 %zs = rand(n,1)*3;
 %plot3(xs,ys,zs,'r('.
 %xlabel('x');ylabel('y');zlabel('z;('
 %p  = patchline(xs,ys,zs,'linestyle','--','edgecolor','g...,'
'    %linewidth',3,'edgealpha',0.2;(
%
 %%%Example 2: (Note "hold on" not necessary here(!
%
 %t = 0:pi/64:4*pi;
 %p(1) = patchline(t,sin(t),'edgecolor','b','linewidth',2,'edgealpha',0.5;(
 %p(2) = patchline(t,cos(t),'edgecolor','r','linewidth',2,'edgealpha',0.5;(
 %l = legend('sine(t)','cosine(t;('(
 %tmp = sort(findobj(l,'type','patch;((
 %for ii = 1:numel(tmp(
    %set(tmp(ii),'facecolor',get(p(ii),'edgecolor'),'facealpha',get(p(ii),'edgealpha'),'edgecolor','none('
```

```
 %end
%
 %%%Example 3 (requires Image Processing Toolbox:(
)   %%%NOTE that this is NOT the same as showing a transparent image on
        %%%of the existing image. (That functionality is
        %%%available using showMaskAsOverlay or imoverlay.(
        %%%Instead, patchline plots transparent lines over
        %%%the image(.
%
 %img = imread('rice.png;('
 %imshow(img(
 %img = imtophat(img,strel('disk',15;((
 %grains = im2bw(img,graythresh(img;((
 %grains = bwareaopen(grains,10;(
 %edges = edge(grains,'canny;('
 %boundaries = bwboundaries(edges,'noholes;('
 %cmap = jet(numel(boundaries;((
 %ind = randperm(numel(boundaries;((
 %for ii = 1:numel(boundaries(
 %patchline(boundaries{ii}(:,2),boundaries{ii}(:,1...,(
'     %edgealpha',0.2,'edgecolor',cmap(ind(ii),:),'linewidth',3;(
 %end
%
 %Written by Brett Shoelson, PhD
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٢٠١٢/٣١/٥ %
 %
 %Revisions:
```

```
٢۶/۶ %Improved rice.png example, modified FEX image.
%
 %Copyright 2012 MathWorks, Inc.
%
 %See also: patch, line, plot

]zs,PVs] = parseInputs(varargin;({:}
if rem(numel(PVs),2) ~= 0
 %     Odd number of inputs!
    error('patchline: Parameter-Values must be entered in valid pairs('
end

 %Facecolor = 'k' is (essentially) ignored here, but syntactically necessary
if isempty(zs(
    p = patch([xs(:);NaN],[ys(:);NaN],'k;('
else
    p = patch([xs(:);NaN],[ys(:);NaN],[zs(:);NaN],'k;('
end

 %Apply PV pairs
for ii = 1:2:numel(PVs(
    set(p,PVs{ii},PVs{ii+1({
end
if nargout == 0
    clear p
end

function [zs,PVs] = parseInputs(varargin(
```

```
if isnumeric(varargin{1({
    zs = varargin{1;{
    PVs = varargin(2:end;(
else
    PVs = varargin;
    zs;[] =
end
```