
Subject: Re: vector plots on maps

Posted by [Martin Schultz](#) on Tue, 03 Feb 1998 08:00:00 GMT

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mirko_vukovic@notes.mrc.sony.com wrote:

>
> hello,
>
> is there a routine by which I can overplot a vector field on a map?
>
> velovect cannot do the job.
>
> tia,
>
> mirko vukovic

... depends on *why* velovect can't do the job. When I had to do this a while ago, I had the problem that velovect would always autoscale the arrows, but I wanted wind vectors to be the same scale on every plot I made. So a colleague of mine from Juelich had this routine velov_fr which has some adaptations. Try it (or describe in more detail what's wrong with velovec)!

Regards,
Martin.

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PRO VELOV_Fr,U,V,X,Y, Missing = Missing, Length = length, Dots = dots, \$
Color=color, _EXTRA = extra

```
;  
;+  
; NAME:  
; VELOVECT
```

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;
; PURPOSE:
;   Produce a two-dimensional velocity field plot.
;
;   A directed arrow is drawn at each point showing the direction and
;   magnitude of the field.
;
; CATEGORY:
;   Plotting, two-dimensional.
;
; CALLING SEQUENCE:
;   VELOVECT, U, V [, X, Y]
;
; INPUTS:
;   U:   The X component of the two-dimensional field.
;        U must be a two-dimensional array.
;
;   V:   The Y component of the two dimensional field. Y must have
;        the same dimensions as X. The vector at point (i,j) has a
;        magnitude of:
;
;           
$$(U(i,j)^2 + V(i,j)^2)^{0.5}$$

;
;        and a direction of:
;
;           
$$\text{ATAN2}(V(i,j),U(i,j)).$$

;
; OPTIONAL INPUT PARAMETERS:
;   X:   Optional abscissae values. X must be a vector with a length
;        equal to the first dimension of U and V.
;
;   Y:   Optional ordinate values. Y must be a vector with a length
;        equal to the first dimension of U and V.
;
; KEYWORD INPUT PARAMETERS:
;   MISSING: Missing data value. Vectors with a LENGTH greater
;           than MISSING are ignored.
;
;   LENGTH: Length factor. The default of 1.0 makes the longest (U,V)
;           vector the length of a cell.
;
;   DOTS:   Set this keyword to 1 to place a dot at each missing point.
;           Set this keyword to 0 or omit it to draw nothing for missing
;           points. Has effect only if MISSING is specified.
;
;   COLOR:  The color index used for the plot.
;
; Note: All other keywords are passed directly to the PLOT procedure

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;         and may be used to set option such as TITLE, POSITION,
;         NOERASE, etc.
; OUTPUTS:
;     None.
;
; COMMON BLOCKS:
;     None.
;
; SIDE EFFECTS:
;     Plotting on the selected device is performed. System
;     variables concerning plotting are changed.
;
; RESTRICTIONS:
;     None.
;
; PROCEDURE:
;     Straightforward. Unrecognized keywords are passed to the PLOT
;     procedure.
;
; MODIFICATION HISTORY:
;     DMS, RSI, Oct., 1983.
;     For Sun, DMS, RSI, April, 1989.
;     Added TITLE, Oct, 1990.
;     Added POSITION, NOERASE, COLOR, Feb 91, RES.
;     August, 1993. Vince Patrick, Adv. Visualization Lab, U. of Maryland,
;     fixed errors in math.
;     August, 1993. DMS, Added _EXTRA keyword inheritance.
;-
;
;     on_error,2           ;Return to caller if an error occurs
;     s = size(u)
;     t = size(v)
;     if s(0) ne 2 then begin
baduv:  message, 'U and V parameters must be 2D and same size.'
;         endif
;         if total(abs(s(0:2)-t(0:2))) ne 0 then goto,baduv
;
;     if n_params(0) lt 3 then x = findgen(s(1)) else $
;         if n_elements(x) ne s(1) then begin
badxy:  message, 'X and Y arrays have incorrect size.'
;         endif
;         if n_params(1) lt 4 then y = findgen(s(2)) else $
;             if n_elements(y) ne s(2) then goto,badxy
;
;     if n_elements(missing) le 0 then missing = 1.0e30
; FR's
; alt   if n_elements(length) le 0 then length = 1.0

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mag = sqrt(u^2+v^2)           ;magnitude.
      ;Subscripts of good elements
nbad = 0                       ;# of missing points
if n_elements(missing) gt 0 then begin
    good = where(mag lt missing)
    if keyword_set(dots) then bad = where(mag ge missing, nbad)
endif else begin
    good = lindgen(n_elements(mag))
endelse

ugood = u(good)
vgood = v(good)
x0 = min(x)                   ;get scaling
x1 = max(x)
y0 = min(y)
y1 = max(y)
x_step=(x1-x0)/s(1)
y_step=(y1-y0)/s(2)
;FR's
maxmag=max([max(ugood/x_step),max(vgood/y_step)])
if n_elements(length) gt 0 then maxmag=length/x_step
sina = (ugood/maxmag)
cosa = (vgood/maxmag)
print,maxmag
; alt   sina = length * (ugood/maxmag)
; alt   cosa = length * (vgood/maxmag)
;
if n_elements(title) le 0 then title = "
;----- plot to get axes -----
if n_elements(color) eq 0 then color = !p.color
x_b0=x0-x_step
x_b1=x1+x_step
y_b0=y0-y_step
y_b1=y1+y_step
if n_elements(position) eq 0 then begin
;   plots,[x_b0,x_b1],[y_b1,y_b0],/nodata,/xst,/yst, $
;   color=color, _EXTRA = extra
endif else begin
;   plots,[x_b0,x_b1],[y_b1,y_b0],/nodata,/xst,/yst, $
;   color=color, _EXTRA = extra
endelse
;
r = .3                         ;len of arrow head
angle = 22.5 * !dior           ;Angle of arrowhead
st = r * sin(angle)           ;sin 22.5 degs * length of head
ct = r * cos(angle)
;

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for i=0,n_elements(good)-1 do begin ;Each point
  x0 = x(good(i) mod s(1)) ;get coords of start & end
  dx = sina(i)
  x1 = x0 + dx
  y0 = y(good(i) / s(1))
  dy = cosa(i)
  y1 = y0 + dy
  xd=x_step
  yd=y_step
  plots,[x0,x1,x1-(ct*dx/xd-st*dy/yd)*xd, $
        x1,x1-(ct*dx/xd+st*dy/yd)*xd], $
        [y0,y1,y1-(ct*dy/yd+st*dx/xd)*yd, $
        y1,y1-(ct*dy/yd-st*dx/xd)*yd], $
        color=color
  endfor
; if nbad gt 0 then $ ;Dots for missing?
; oplot, x(bad mod s(1)), y(bad / s(1)), psym=3, color=color
end

```

File Attachments

1) [velov_fr.pro](#), downloaded 120 times
