Subject: Re: Array sorting by row
Posted by JD Smith on Tue, 22 Aug 2006 23:35:05 GMT
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Find below the routine SORT_ND, which efficiently sorts arrays of any size along any arbitrary dimension, using the concepts discussed in this thread. Finally HIST_ND has a friend...

JD

```
;+
; NAME:
;       SORT_ND
;
; PURPOSE:
;
;       Efficiently perform an N-dimensional sort along any dimension
;       of an array.
;
; CALLING SEQUENCE:
;
;       inds=sort_nd(array,dimension)
;
; INPUTS:
;
;       array: An array of at least 2 dimensions to sort.
;
;       dimension: The dimension along which to sort, starting at 1
;         (1:rows, 2:columns, ...).
;
; OUTPUTS:
;
;       inds: An index array with the same dimensions as the input
;         array, containing the (1D) sorted indices.  Can be used
;         directly to index the arary (ala SORT).
;
; EXAMPLE:
;
;       a=randomu(sd,5,4,3,2)
;       sorted=a[sort_nd(a,2)]
;
; SEE ALSO:
;
;       HISTOGRAM
;
; MODIFICATION HISTORY:
;
;       Tue Aug 22 15:51:12 2006, J.D. Smith <jdsmith@as.arizona.edu>
```

```
;
;  Written, based on discussion on c.l.i-p, 08/2006.
;
;-
 ;#####################################################################
####################
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;
 ;#####################################################################
####################

function sort_nd, array, dimension
  sz=size(array,/DIMENSIONS)
  ndim=n_elements(sz)
  s=sort(array)

  if dimension eq 1 then begin  ; mark along dimension with index
     inds=s/sz[0]
  endif else begin
     p=product(sz,/CUMULATIVE,/PRESERVE_TYPE)
     inds=s mod p[dimension-2]
     if dimension lt ndim then inds+=s/p[dimension-1]*p[dimension-2]
  endelse

  h=histogram(inds,REVERSE_INDICES=ri)
  ri=s[ri[n_elements(temporary(h))+1:*]]
  if dimension eq 1 then return,reform(ri,sz,/OVERWRITE) $
  else begin            ; target dimension is collected to front, rearrange it
     t=[dimension-1,where(lindgen(ndim) ne dimension-1)]
     ri=reform(ri,sz[t],/OVERWRITE)
```

```
    return,transpose(ri,sort(t))
  endelse
end
```