

---

Subject: Re: mode of a continuous distribution  
Posted by [penteado](#) on Tue, 24 Aug 2010 22:42:33 GMT  
[View Forum Message](#) <> [Reply to Message](#)

---

On Aug 24, 6:32 pm, Gray <grayliketheco...@gmail.com> wrote:

> Hi all,  
>  
> I have an array of data from a continuous distribution (non-Gaussian),  
> and I'd like to find the mode. I have two ideas:  
>  
> 1) an iterative histogram method, where I find the max for smaller &  
> smaller binsizes until it converges;  
> 2) some sort of kernel density estimation method to estimate the  
> distribution, and then find the max from that.  
>  
> Anyone implemented this sort of thing before? Any suggestions?  
>  
> --Gray

There is a kdf routine at

[http://www.faculty.iu-bremen.de/jvogt/cospar/cbw6/ComputerSessions/BasicAnalysisTechniques\\_Vogt/ex2/](http://www.faculty.iu-bremen.de/jvogt/cospar/cbw6/ComputerSessions/BasicAnalysisTechniques_Vogt/ex2/)

---

---

Subject: Re: mode of a continuous distribution  
Posted by [Gray](#) on Thu, 26 Aug 2010 13:15:56 GMT  
[View Forum Message](#) <> [Reply to Message](#)

---

On Aug 24, 6:42 pm, Paulo Penteado <pp.pente...@gmail.com> wrote:

> On Aug 24, 6:32 pm, Gray <grayliketheco...@gmail.com> wrote:  
>  
>> Hi all,  
>  
>> I have an array of data from a continuous distribution (non-Gaussian),  
>> and I'd like to find the mode. I have two ideas:  
>  
>> 1) an iterative histogram method, where I find the max for smaller &  
>> smaller binsizes until it converges;  
>> 2) some sort of kernel density estimation method to estimate the  
>> distribution, and then find the max from that.  
>  
>> Anyone implemented this sort of thing before? Any suggestions?  
>  
>> --Gray  
>  
> There is a kdf routine at  
>

> <http://www.faculty.iu-bremen.de/jvogt/cospar/cbw6/ComputerSessions/Ba...>

Okay, folks, here's my routine for the mode of a continuous distribution. As far as I can tell, it works (of course, it doesn't help me solve my problem, which has to do with something else entirely):

```
;+
; NAME:
;   KDF_MODE
; PURPOSE:
;   Find the mode of a sample from a continuous 1-d distribution
; EXPLANATION:
;   Finds the mode by finding the maximum of the probability
;   distribution, as found by a kernel density estimation with a
;   Gaussian kernel.
; CALLING EXAMPLE:
;   mode = kdf_mode(x)
; INPUTS:
;   x = array of sample points
; KEYWORDS:
;   None.
; OUTPUT:
;   Returns the mode of the distribution
; COMMON BLOCKS:
;   kdf_x (to pass the data array around)
; PROCEDURE:
;   This function uses MINF_BRACKET and MINF_PARABOLIC from the
;   NASA astronomy IDL library to maximize the KDF without using
PDEs.
; MODIFICATION HISTORY:
;   Written, Gray Kanarek 2010.
;-
FUNCTION kdf, u
  common kdf_x, xx
  nu = n_elements(u)
  case nu of
    0: message, 'U must be a scalar or array of target values'
    1: res = u*0
  else: begin
    s = size(u)
    res = make_array(s[1:s[0]],value=0.,type=size(type,/dim))
  end
endcase
lim = [-6,6.]
for i=0,nu-1 do begin
  arg = u[i]-xx
  nonz = where(arg ge lim[0] and arg le lim[1],nz)
```

```
    if (nz eq 0) then continue
    res[i] = total(exp(-arg[nonz]^2/2.)/2.5066283)/n_elements(xx)
endfor
return, -res ;we're looking for the max, so return negative prob.
end
```

```
FUNCTION kdf_mode, x_array
common kdf_x
xx = x_array
xa = min(xx) & xb = max(xx)
minf_bracket, xa, xb, xc, func='kdf'
minf_parabolic, xa, xb, xc, xm, fm, func='kdf'
return, xm
end
```

---