

# Re: metric in which balls are triangles

---

*Source:* <http://sci.tech--archive.net/Archive/sci.math/2005-04/msg01121.html>

---

- *From:* [hruhin@xxxxxxxxxxxxxxxxxxxxxx](mailto:hruhin@xxxxxxxxxxxxxxxxxxxxxx) (Herman Rubin)
  - *Date:* 7 Apr 2005 15:11:12 -0500
- 

In article <d31n8r\$qd9\$1@xxxxxxxxxxxxxxxxxxxxxx>,

Robert Israel <israel@xxxxxxxxxxxx> wrote:

>In article <1112821803.685824.241000@xxxxxxxxxxxxxxxxxxxxxx>,

>lukasz <bbla32@xxxxxx> wrote:

>>Can anyone provide a hint on how to define a metric  $d:R^*R \rightarrow R$  in which  
>>all balls are triangles (any or at least isosceles)? I tried with a  
>>function that returned the circumradius for the isosceles triangle with  
>>one (bottom) edge parallel to the OX axis, where one coordinate was a  
>>point on a triangle and the other was the circumcenter; although these  
>>two points unequivocally defined a triangle, such a function obviously  
>>did not meet the symmetry condition for a metric.

>>I suppose the function should rather be similar to the metric in which  
>>all balls are squares:

$$\text{>>}d(x,y), (a,b) = \max\{|x - a|, |y - b|\}$$

>>but I can't think of anything like this for triangles. Any ideas?

>It's not at all obvious that such a metric can exist. Do you  
>have any reason to think that it does? Certainly there won't  
>be a simple formula: it can't be a norm.

A semi-norm can exist, but it fails to be symmetric; in fact, any compact convex set with a designated "origin" as an internal point can produce such a semi-norm. This will be highly directional, and the semi-norm of  $x-y$  and  $y-x$  will not be equal for a triangle.

—

This address is for information only. I do not claim that these views are those of the Statistics Department or of Purdue University.

Herman Rubin, Department of Statistics, Purdue University

[hruhin@xxxxxxxxxxxxxxxxxxxxxx](mailto:hruhin@xxxxxxxxxxxxxxxxxxxxxx) Phone: (765)494-6054 FAX: (765)494-0558

.

- 
- *Follow-Ups:*
    - ◆ [Re: metric in which balls are triangles](#)

Re: metric in which balls are triangles

◇ *From:* Robert Israel

• **References:**

◆ ***metric in which balls are triangles***

◇ *From:* lukasz

◆ ***Re: metric in which balls are triangles***

◇ *From:* Robert Israel

• Prev by Date: ***Re: Topicality: James Harris and surrogate factoring (vote)***

• Next by Date: ***Power Sets***

• Previous by thread: ***Re: metric in which balls are triangles***

• Next by thread: ***Re: metric in which balls are triangles***

• Index(es):

◆ ***Date***

◆ ***Thread***