

Re: A set containing a nonempty open interval

Source: <http://sci.tech--archive.net/Archive/sci.math/2005-08/msg05127.html>

- *From:* kLewis@xxxxxxxxxxxxxxxx (Keith A. Lewis)
 - *Date:* Fri, 26 Aug 2005 18:19:24 +0000 (UTC)
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"Amanda" <sca18@xxxxxxxxxxxx> writes in article
<1125067955.450481.88600@xx> dated 26 Aug 2005 07:52:35 -0700:
>
>I'd like some hints on how to prove that, if a set S has positive
>Lebesgue measure, then $(A + A)/2 = \{(x + y)/2 \mid x \text{ and } y \text{ are in } A\}$
>contains a non-empty open interval.

Unless you specify $x <> y$, you might get all closed intervals.

For example,

$$A = [0,1] \cup [10,11]$$

gives

$$(A+A)/2 = [0,1] \cup [5,6] \cup [10,11]$$

which contains no open intervals.

But if you stipulate $x <> y$ you get

$$(A+A)/2 = (0,1) \cup [5,6] \cup (10,11)$$

which does contain open intervals.

U is the union operator.

—Keith Lewis [kLewis {at} mitre.org](mailto:kLewis@mitre.org)

The above may not (yet) represent the opinions of my employer.

- *Follow-Ups:*

- ◆ [*Re: A set containing a nonempty open interval*](#)

◇ *From:* Amanda

- ◆ [*Re: A set containing a nonempty open interval*](#)

◇ *From:* A N Niel

- *References:*

- ◆ [*A set containing a nonempty open interval*](#)

◇ *From:* Amanda

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