

Re: central forces

Source: <http://sci.tech--archive.net/Archive/sci.math/2005-12/msg03705.html>

- *From:* William Elliot <marsh@xxxxxxxxxxxxxxxxxxxxx>
 - *Date:* Mon, 19 Dec 2005 23:08:28 -0800
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On Mon, 19 Dec 2005, Robert Low wrote:

> Tony wrote:

>>

>> Suppose,

>> $F(r) = -m(36/r^2 + 27/r^3)$

>

> If this is supposed to be a force, shouldn't there

> be a vector somewhere?

>

Not necessarily for beginning students working in one spacial dimension. Even so, the physical dimensions of that equation are unbalanced which is sloppy practice to develop. Two Mars missions were lost for just that reason, not giving the physical dimensions of numbers.

>> and it's initial position and velocity is given by

>

> What is 'it'?

>

The mass m thing that's getting pushed around by a forceful $F(r)$ bully?

>> $\theta(0)=0$

Oh, polar coordinates?

>> $x(0) = 2e\{r\}$

Huh, now rectangular coordinates?

>> $v(0) = 3e\{\theta\}$

What's $2e\{r\}$ and $3e\{\theta\}$?

>> Show that

>> $u(\theta) = 1/4[1 + \cos(\theta/2)]$

>

> What is u ?

>

Common student use of mental telepathy as it's so very apparent to them what u is.

Re: central forces

> If you actually state your question, you might have
> more luck getting somebody to help you with it.
>
Or even understanding it yourself, OP.

> But, guessing that there's an invisible e_r in your
> F , and that u is $1/r$, then what you want to do
> is to get a differential equation for the orbit
> in the form $du/d\theta = \text{"something"}$. This is a completely
> standard trick which you should find in any mechanics
> book which covers the usual inverse square law force,
> so I'll leave you to find it for yourself.
>
.

• *Follow-Ups:*

- ◆ *Re: central forces*
 ◇ *From: Tony*

• *References:*

- ◆ *central forces*
 ◇ *From: Tony*
- ◆ *Re: central forces*
 ◇ *From: Robert Low*

- Prev by Date: *Addition Law and $K \cdot P$ for Montgomery-form Curves*
- Next by Date: *Re: Translating a compound statement into a symbolic form*
- Previous by thread: