Re: Can energy conservation be derived from Newton's motion laws

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From: Daniel E. Platt (*DanP57_at_optonline.net*)
Date: 01/06/05

Date: Thu, 6 Jan 2005 22:11:30 +0000 (UTC)

Strong_Field wrote:
> "Dan Platt" <DanP57@ispwest.com> wrote in message
> news:cqpqkq0hvj@enews3.newsguy.com...
>
>
>>Grad is usually definable this way (x, dx vectors; s, V scalars):
>>
>>V(x + s dx) = V(x) + s grad V . dx + O(s^2).
>
>
> This seems to corroborate what I wrote initially. Ignoring your functio=
ns s
> and O, I don't know what they are, your expression simplifies essential=
ly to
> dy/dx = grad V. Does this definition say more than the definition giv=
en in
> the other post as a vector pointing in the greatest increase and having=
 the
> magnitude of change in velocity?

This was a Taylor (power) series in s, easier than a power series in mixed dx components. The O() refers to powers of s^2 and higher (ie, some number times s^2 + another number times s^3 +...). It did look like the kind of thing you said you wanted, along with a method to get there. However, it is not always possible to extract such a power series (the degenerate perturbation series for matrices is an example).

>
>
>>... the idea of conservation of energy is a fundamental (distinct from
>>basic) physical idea. Perhaps it is more meaningful to ask what kind o=
f
>>force satisfies conservation of energy given Newton's laws. If
>>conservation of energy is a dominant physical mode of behavior that
>>penetrates into thermodynamics, etc, then all of the important forces
>>that will show up in the application of Newton's laws will have a

>>gradient−like behavior.
>
>
> I think you are trying to say that conservation of energy is the fundam=
ental
> axiom of physics. If so I agree.

I would not even quite say it is an