

Re: Newton Vs Lagrange Vs Hamilton

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Neil Price wrote:

> *vonny@hotmai.com (Vonny N) wrote in message*
news:<df799de5.0503251424.2f339940@posting.google.com>...

>

>> *What is the relationship between:*

>>

>> *1. Newtonian Mechanics*

>> *2. Lagrangian Mechanics*

>> *3. Hamiltonian Mechanics*

1 is a special case of 3 which is a special case of 2.

>> *Can they be declared to be *rigorously* mathematically equivalent?*

No.

> *On the other hand, Hamiltonian mechanics is more directly amenable to*

> *techniques from symplectic geometry, e.g. symplectic reduction,*

> *definitions involving integrability, etc.*

There is also a symplectic view of Lagrangian mechanics, presented,
e.g., in the book on Mechanics and Symmetry by Marsden and Ratiu.

>> *Finally, is there a book on classical mechanics which treats all three*

>> *of these approaches to mechanics, along with their*

>> *inter-relationships, with mathematical rigour?*

Marsden and Ratiu give an almost rigorous approach.

> *See the book "foundations of mechanics" by Abraham and Marsden or*

> *"introduction to mechanics and symmetry" by Marsden and Ratiu.*

Marsden and Ratiu give an almost rigorous approach.

Arnold Neumaier