

## Re: Variational calculus : A drop of water

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*Source:* <http://sci.tech-archive.net/Archive/sci.math/2009-04/msg01568.html>

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- *From:* John Bailey <[john\\_bailey@xxxxxxxxxxxxxxxxxxx](mailto:john_bailey@xxxxxxxxxxxxxxxxxxx)>
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On Thu, 16 Apr 2009 02:07:56 -0700 (PDT),  
charlescalculus\_robortobaggio@xxxxxxxxxxxx wrote:

Hi, anyone observed a drop of water before and noticed that while falling, it is supposed to be spherical?

I know that it is a sphere but I need to prove it using variaional calculus. Anyone got any hints?

Also, what good book are there on these kind of isoperimetric problems?

I've got a book by I.M. Gelfand and Fomin, but it doesn't cover this problem.

<http://arxiv.org/abs/chao-dyn/9811020>

Simulation of a Dripping Faucet by Nobuko Fuchikami, Shunya Ishioka 1 and Ken Kiyono

"A dripping faucet system is simulated. We numerically show that a hanging drop generally has many equilibrium shapes but only one among them is stable. By taking a stable equilibrium shape as an initial state, a simulation of dynamics is done, for which we present a new algorithm based on Lagrangian description."

"In Appendix A, we describe a variational algorithm to examine stability of static solutions. Our algorithm of simulation of dynamics is presented in Appendix B."

Its been a long time since I used this. Good luck!

There was an extensive discussion of the problem on sci.physics

[http://groups.google.com/group/sci.physics/browse\\_thread/thread/83aecebdfb7d6876/ae3477605ebf7a59](http://groups.google.com/group/sci.physics/browse_thread/thread/83aecebdfb7d6876/ae3477605ebf7a59)

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