
Subject: Calculating streamfunction from wind components
Posted by [Sir Loin Steak](#) on Thu, 14 Feb 2013 17:22:01 GMT
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Does anyone know if there are any IDL routines that can calculate the horizontal streamfunction from given zonal and meridional wind components? I have searched online and on this forum, and am surprised I can't find anything.

I could probably write my own, but it would make my life easier if there was already one available!

Thanks,

Liam

Subject: Re: Calculating streamfunction from wind components
Posted by [james.rachellanne](#) on Thu, 09 May 2013 20:40:32 GMT
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Hi Liam,

I'm looking to do something similar. Did you ever find anything useful?

Cheers,

Rachel

Subject: Re: Calculating streamfunction from wind components
Posted by [Kenneth Bowman](#) on Fri, 10 May 2013 16:32:34 GMT
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On 2013-05-09 20:40:32 +0000, james.rachellanne@googlemail.com said:

> Hi Liam,
>
> I'm looking to do something similar. Did you ever find anything useful?
>
> Cheers,
>
> Rachel

Is the flow 2-D and incompressible so that

$u = -d \psi / dy$

and

$v = d(\psi)/dx$?

Depending on your boundary conditions, you may be able to integrate across the domain in one direction or the other to get a streamfunction.

Otherwise you have to solve the elliptic problem for ψ . There is a table of cases (2-D, 3-D, irrotational, etc.) in Dutton's book on atmospheric dynamics.

You can calculate streamlines (which are equivalent to the streamfunction in special cases) using a trajectory model (which is, in general, a non-trivial undertaking).

Ken Bowman

Subject: Re: Calculating streamfunction from wind components
Posted by [james.rachelanne](#) on Mon, 20 May 2013 10:08:25 GMT
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Hi Ken,

Sorry for the delayed response I only just noticed your reply. Thanks for the tips. Fortunately I have now found another way of investigating the problem without calculating streamfunction. I will certainly bear this advice in mind if I do need to compute it later, although I think it would be a challenge as I don't have much background in fluid dynamics, so I would still be interested to know if anyone finds any IDL code for a horizontal grid, or any code at all for a vertical cross section.

Many thanks,

Rachel
