



Jason Byrne <jbyrne6@gmail.com>

Best fit plots

13 messages

David Long <long.daithi@gmail.com>**11 February 2009 16:19**

To: Peter Gallagher <peter.gallagher@tcd.ie>, James McAteer <rtjmca@gmail.com>, Jason <jbyrne6@gmail.com>, Shaun Bloomfield <shaun.bloomfield@tcd.ie>

Hi everybody

Attached a series of plots for 195 and 171 data for the events under consideration here.

In each case, I've plotted the plain distance data in the upper plot then fitted 2 equations to the data:

- A best fit for an equation of the form $h = h_0 + v_0*t + 0.5*a_0*t^2$
- A best fit for an equation of the form $h = h_0 + v_0*t$

In each case I've noted the velocity and acceleration given by the fit, along with the start time of the disturbance according to the fit in minutes prior to first observation in 195A.

The bottom plot shows the data after I've applied DERIV (no smoothing) and then used the previous fit to plot the expected velocity according to the different equations under consideration.

The fits for the distance data are good, but then again, most fits would be a good approximation. When it comes to the velocity, DERIV is again pulling down the end points, which is a problem.

Any ideas?

Thanks

--

David Long
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David Long <long.daithi@gmail.com>**11 February 2009 16:20**

To: jbyrne6@gmail.com

16:20 **me:** u can add a thingy that alerts you anytime you have the word attached in your email but there's no attachment
LOOK AT ME

David Long <long.daithi@gmail.com>**11 February 2009 16:22**

To: Peter Gallagher <peter.gallagher@tcd.ie>, James McAteer <rtjmca@gmail.com>, Jason <jbyrne6@gmail.com>, Shaun Bloomfield <shaun.bloomfield@tcd.ie>

Sorry!

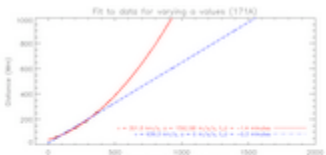
Gmail didn't remind me that I'd forgotten to attach the files...

2009/2/11 David Long <long.daithi@gmail.com>

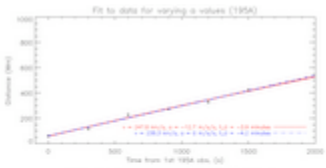
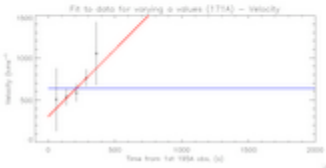
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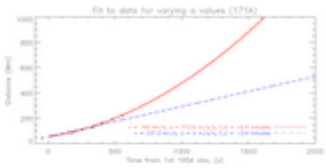
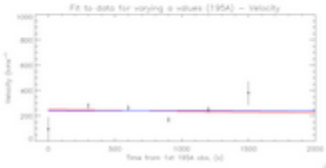
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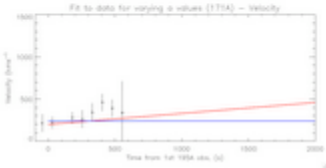
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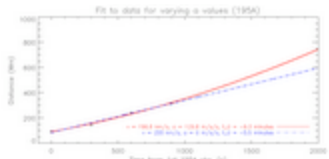


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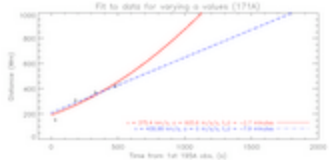
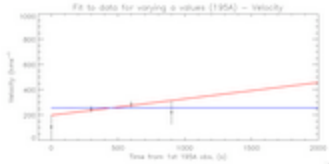


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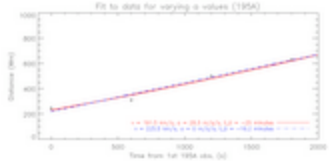
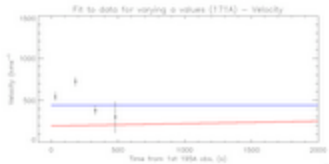




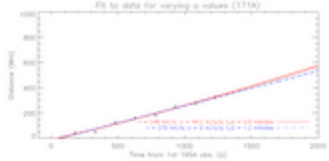
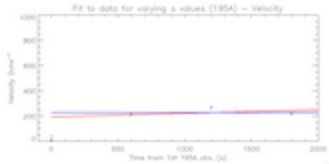
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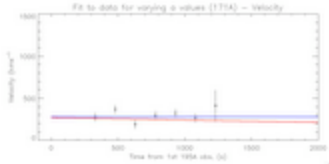
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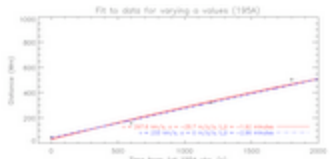


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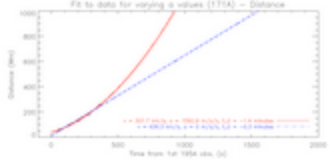
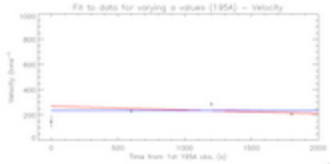


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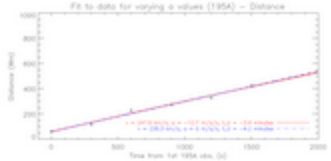
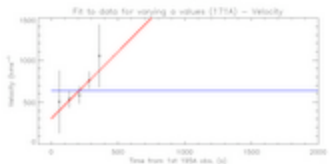




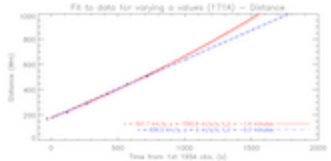
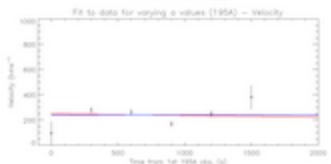
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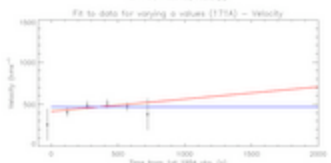
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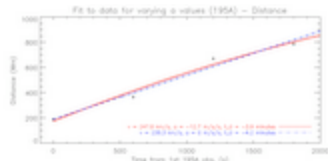


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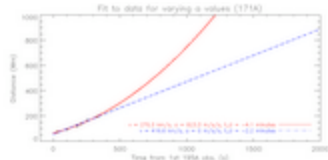
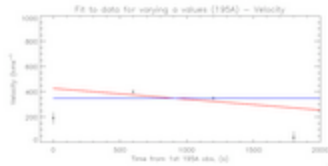
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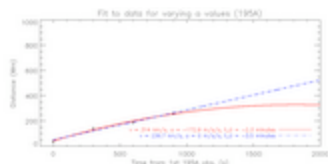
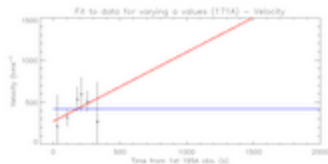
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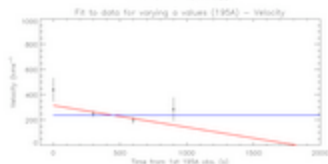
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17K

**Shaun Bloomfield** <shaun.bloomfield@tcd.ie>**11 February 2009 17:05**

To: David Long <long.daithi@gmail.com>

Cc: Peter Gallagher <peter.gallagher@tcd.ie>, James McAteer <rtjmca@gmail.com>, Jason <jbyrne6@gmail.com>

Hi Dave,

I think that there are a few of the non-zero acceleration fits which haven't converged properly. For example, the 171 plot from 20080426 shows the fit finding a positive acceleration when visual inspection looks to be pointing at a negative acceleration.

What are the reduced chi-squared values for each of the two fit options (i.e., zero and non-zero acceleration) for each event?

Shaun.

D. Shaun Bloomfield, PhD

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Phone: +353 1 896 3257
Skype: d.shaun.bloomfield

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David Long <long.daithi@gmail.com>

12 February 2009 16:53

To: Shaun Bloomfield <shaun.bloomfield@tcd.ie>

Cc: Peter Gallagher <peter.gallagher@tcd.ie>, James McAteer <rtjmca@gmail.com>, Jason
<jbyrne6@gmail.com>

Hi everybody

I've added the chi-squared value for each fit to the data along with cleaning up the ranges and also giving a better idea of the start time predicted by each fit.

The chi-squared values in some cases aren't great as would be expected from some of the fits.

Let me know what you think

Thanks

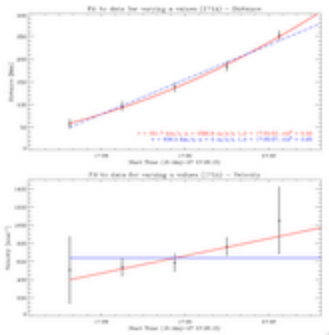
Dave

2009/2/11 Shaun Bloomfield <shaun.bloomfield@tcd.ie>

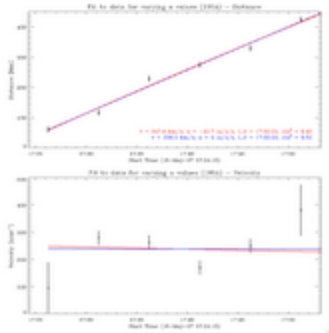
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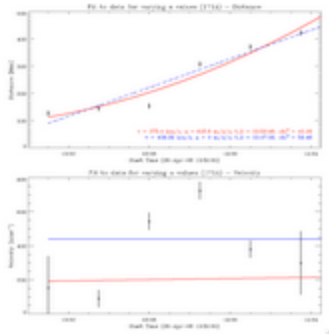
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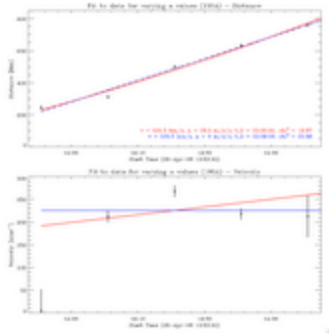
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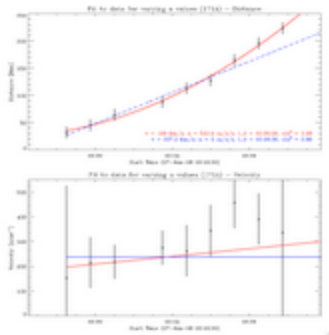
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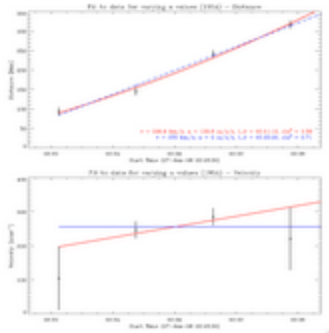
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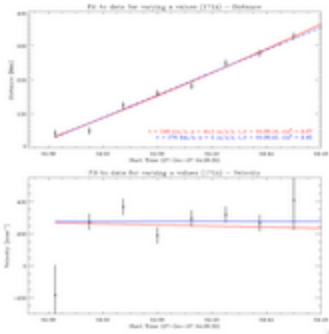
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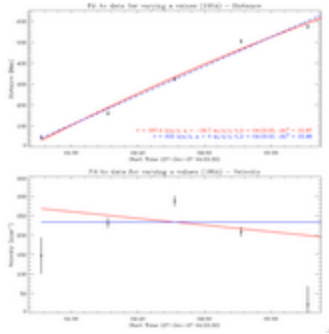
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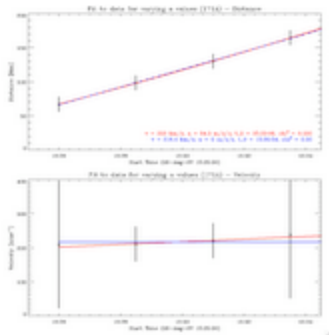
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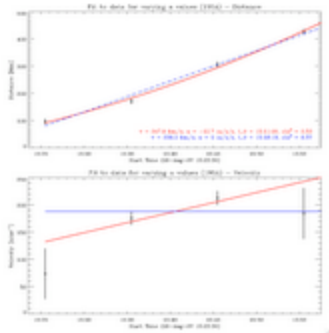
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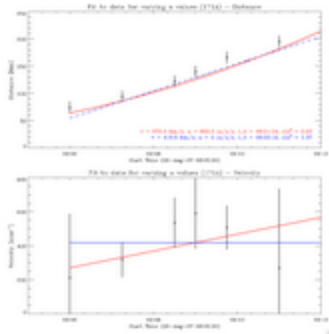
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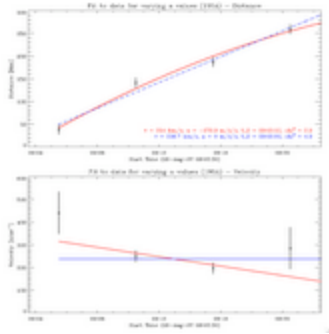
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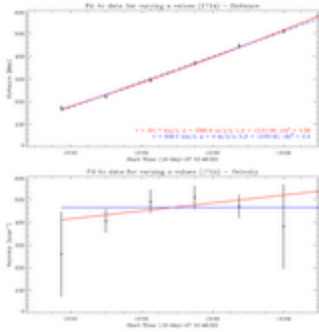
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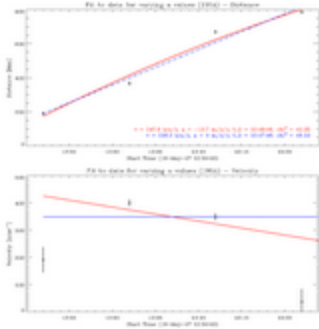
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20070806_1_195_kinematics.png
20K



20070519_171_kinematics.png
19K



20070519_195_kinematics.png
19K

Jason Byrne <jbyrne6@gmail.com>
To: David Long <long.daithi@gmail.com>

12 February 2009 17:02

Why, for example, does **20070806_1_171_kinematics** not look like a good fit by eye?

What do you mean by chi-squared not being 'great'? What would a good value give?

David Long <long.daithi@gmail.com>
To: Shaun Bloomfield <shaun.bloomfield@tcd.ie>
Cc: Peter Gallagher <peter.gallagher@tcd.ie>, James McAteer <rtjmca@gmail.com>, Jason <jbyrne6@gmail.com>

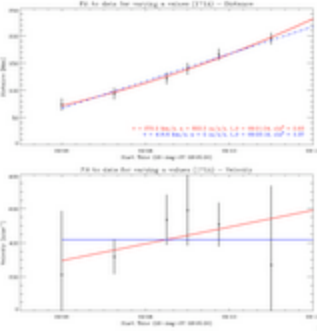
12 February 2009 17:06

Sorry sent the wrong version of this by mistake.

2009/2/12 David Long <long.daithi@gmail.com>

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20070806_1_171_kinematics.png

19K

Jason Byrne <jbyrne6@gmail.com>
To: David Long <long.daithi@gmail.com>

12 February 2009 17:15

What I mean is chi-squared is just the sum of the squares of the distances of each point from the line. So it doesn't really give a measure of anything else does it? It can be as big as necessary (for example if there were outliers) and it makes no consideration for the error bars so a large chi-squared can still be a good fit. Is that right?

David Long <long.daithi@gmail.com>
To: Jason Byrne <jbyrne6@gmail.com>

12 February 2009 17:22

true, but we want the fit that minimises the chi-squared. If the chi-squared is very large, there's a possibility that there may be a better fit to the data than the one under consideration. If the chi-squared value is low, chances are that there won't be a better fit to the data. Am I right?

2009/2/12 Jason Byrne <jbyrne6@gmail.com>

What I mean is chi-squared is just the sum of the squares of the distances of each point from the line. So it doesn't really give a measure of anything else does it? It can be as big as necessary (for example if there were outliers) and it makes no consideration for the error bars so a large chi-squared can still be a good fit. Is that right?

[Quoted text hidden]

Jason Byrne <jbyrne6@gmail.com>
To: David Long <long.daithi@gmail.com>

12 February 2009 17:25

You're not wrong. But chi-squared depends on the scales and outliers etc so it's only comparative I guess. If you get a fit with a lower chi-squared then it might be better because it meets more data points but it doesn't out weigh the other potential fits as being truth!

David Long <long.daithi@gmail.com>
To: Jason Byrne <jbyrne6@gmail.com>

12 February 2009 17:31

Very true. However, the fits given don't take account of the physical nature of the disturbance, the starting point, the starting time, why the first data point is the first observation etc. These are rough fits, and should be treated as such. The projected starting 'point' of the disturbance and the starting time of the disturbance need to be taken into account. It would add errors because they would be assumptions, but this would open up the

question of what is actually under consideration. Each different theory should have a different kinematics curve and by fitting each to the data, the chi-squared value should give an impression of which is the better fit. If one particular curve is consistently a best fit, then it should be seriously considered as a possible 'solution'.

I may just be thinking out loud (or in print) here, but that would be my view.

2009/2/12 Jason Byrne <jbyrne6@gmail.com>

You're not wrong. But chi-squared depends on the scales and outliers etc so it's only comparative I guess. If you get a fit with a lower chi-squared then it might be better because it meets more data points but it doesn't outweigh the other potential fits as being truth!

[Quoted text hidden]

Jason Byrne <jbyrne6@gmail.com>

14 May 2009 09:56

To: David Long <long.daithi@gmail.com>

Cc: Shaun Bloomfield <shaun.bloomfield@tcd.ie>, Peter Gallagher <peter.gallagher@tcd.ie>, James McAteer <rtjmca@gmail.com>

An interesting discussion on curve fitting:

<http://tamino.wordpress.com/2009/05/11/dangerous-curves/>

R. T. James McAteer <rtjmca@gmail.com>

14 May 2009 10:16

To: Jason Byrne <jbyrne6@gmail.com>

Cc: David Long <long.daithi@gmail.com>, Shaun Bloomfield <shaun.bloomfield@tcd.ie>, Peter Gallagher <peter.gallagher@tcd.ie>

Excellent piece.
Kind of scary though.

Now I'll have to read up on the lowess filter.

On 14 May 2009, at 09:56, Jason Byrne wrote:

An interesting discussion on curve fitting:

<http://tamino.wordpress.com/2009/05/11/dangerous-curves/>

R. T. James McAteer

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Skype: rtjmca
