Optimized synthesized spectrum

Jason Cao

New York University

jc6933@nyu.edu

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Overview

1. Optimizing method
   - The Cannon 2 model by Casey
2. Optimizing method
   - Optimize the spectrum
3. Plot
4. Plot
   - Labels
5. Plot
   - Compare spectrum
6. Plot
   - Compare Chi-Square

Details

The model we adopt

$$y_{jn} = v(l_n) * \theta_{jn} + e_j$$

Where y_{jn} is the data for star n at wavelength pixel j.
And $v(l_n)$ is the vectorizing function. The input l_n is the label list of length K for star n and the output $v(l_n)$ is a vector of length D (D is bigger than K).
θ_{jn} is a vector of length D of parameters which controlling the model at wavelength pixel j
e_{jn} is a noise draw or residual at pixel j for star n.

Details

After training the model, $v(l_n)$ and θ_{jn} are available.
$y^s_{jn}ynthesized$ is the synthesized spectrum data for star n at pixel j by Casey's Cannon 2.
$y^s_{jn}ynthesized = v(l^i_nnferred) * \theta_{jn}$ and $l^i_nnferred$ is the inferred labels from Casey's Cannon 2.
Get $y^s_{j,n-1}ynthesized$ and $y^s_{j,n+1}ynthesized$ by moving the synthesized spectrum one pixel left and one pixel right.
Fit the spectrum linearly by using

$$y^o_{j,n}ptimized = a * y^s_{j,n-1}ynthesized + b * y^s_{j,n}ynthesized + c * y^s_{j,n+1}ynthesized$$

And a+b+c should be 1

Table

Treatments	Response 1	Response 2
Treatment 1	0.0003262	0.562
Treatment 2	0.0015681	0.910
Treatment 3	0.0009271	0.296

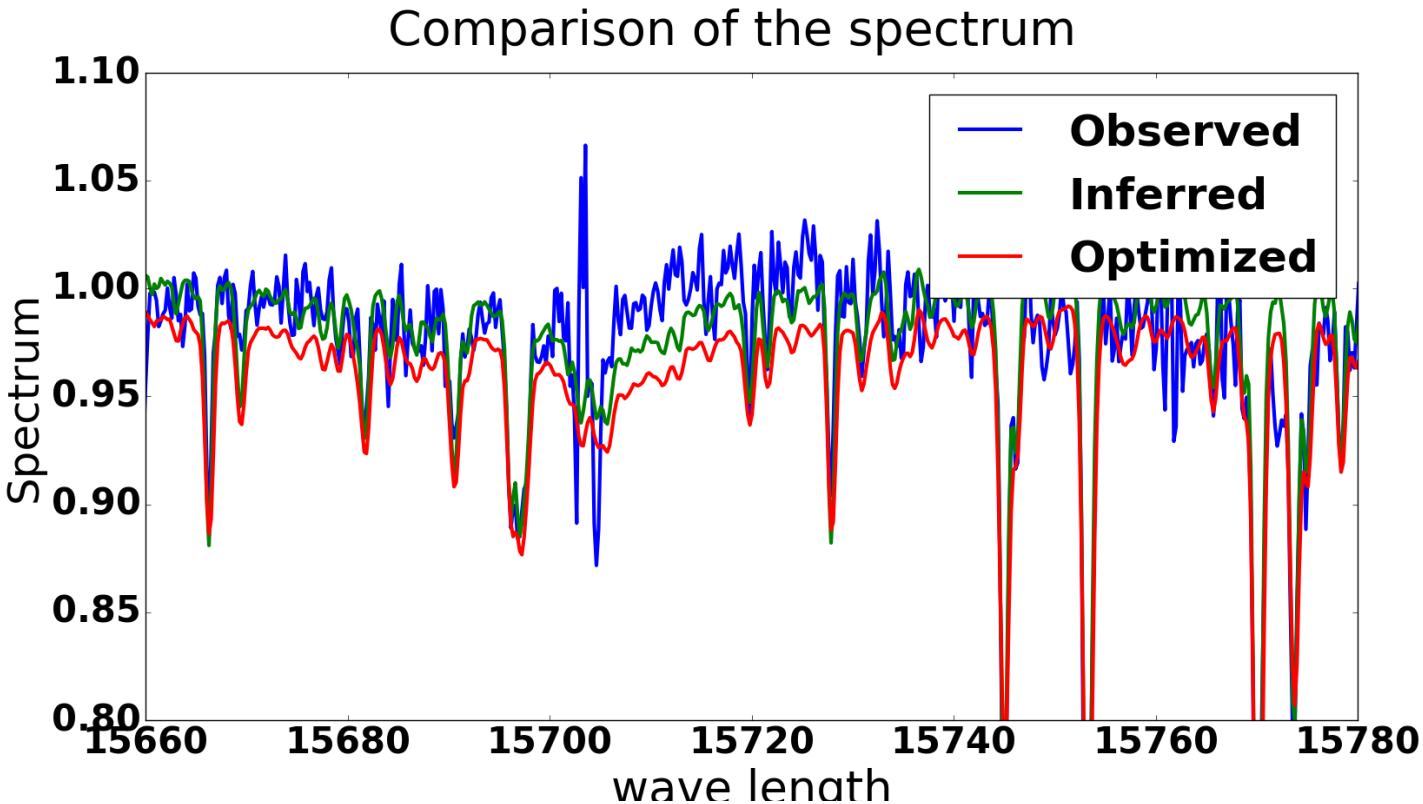
Table: Table caption

Details

After training the model, $v(l_n)$ and θ_{jn} are available.
y^o_{jn} *bserved* is blue
y^i_{jn} *nferred* is green
y^s_{jn} *ynthesized* is red

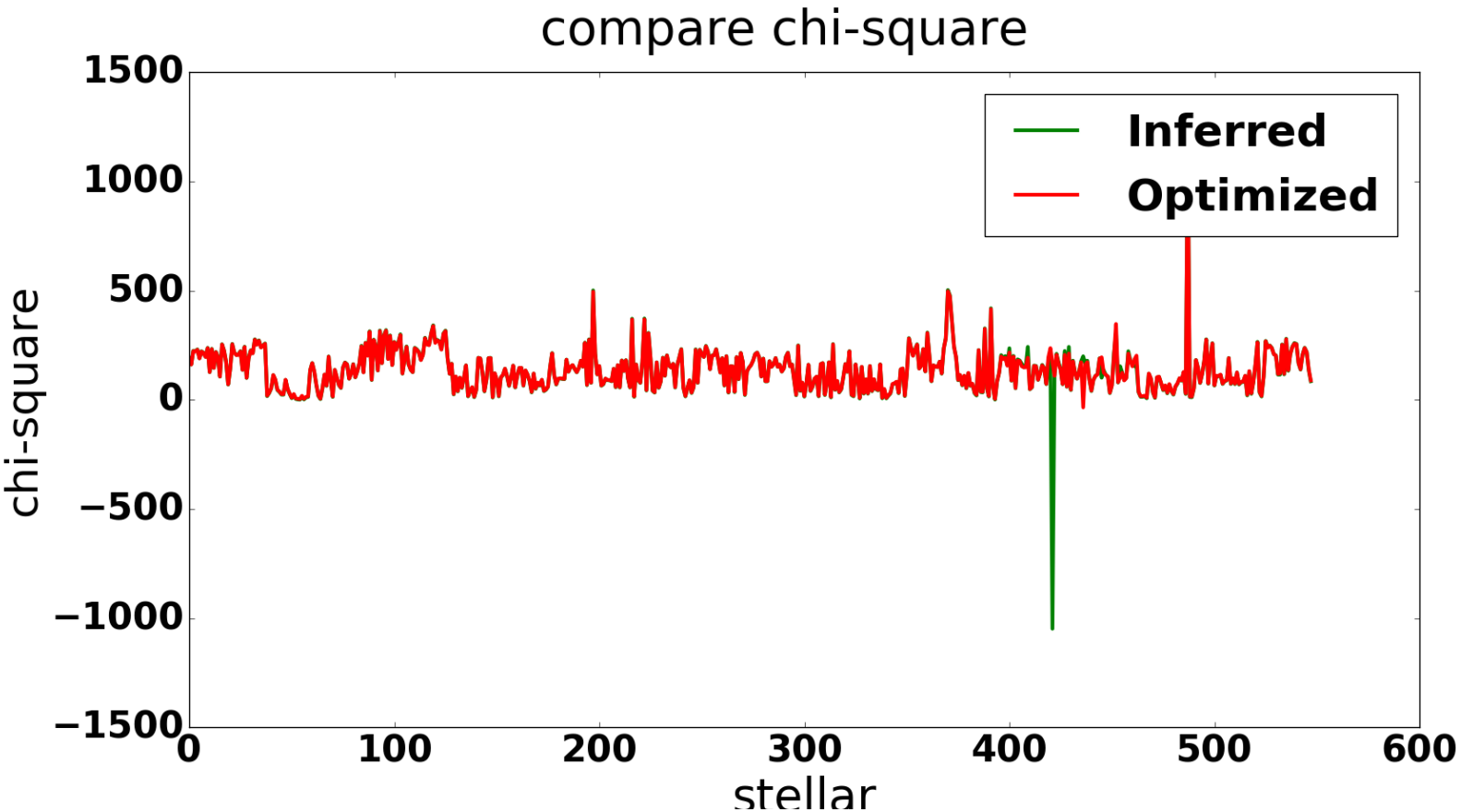
Details

Compare the spectrum: a+b+c=0.984 (a,b,c)=(0.537,0.114,0.333) 2016.8.1-12.23/My codes/Cannon Experiment python 3.5/compare spectrum.png



Details

The chi-squared plot
2016.8.1-12.23/My codes/Cannon Experiment python 3.5/parameter.png



The End