A Platform independent tool to Run Fortran Research Code

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Abstract

The Wilson-Devinney(WD) program is the most widely used program for analyzing eclipsing binary star data. Usually, the user compiles and runs the WD program for a specific platform (Windows/Mac/Unix).To make the WD program more usable, it has to be platform independent. In a University setting, making the program platform independent would make it easier for the students to use it anywhere. By making the program available through a web-browser the flexibility would be further increased.

In this work we are trying to develop a Java Interface for the WD Program as an application in a web-browser, making it completely platform independent. We present the details of our approach and the work done so far, in this poster.

What is WD Code?

When one star passes directly in front of the other, as viewed from Earth, we see an eclipsing binary. Brightness versus time plot for a variable star is known as light curve. WD Code is used to Compute Light Curves
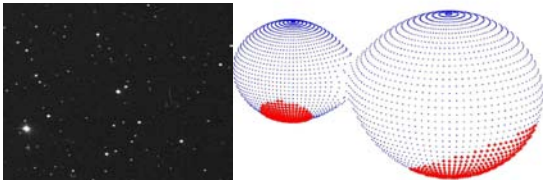
Goal of the WD Model:

Is to simulate the system, which will produce a light curve that matches the observed data

The Mathematical Model will give the system parameters: How big the stars are, Relative Masses of the stars, Temperature of the stars, luminosity and many more astrophysical parameters.

These Numbers are useful in Understanding the evolution of a star.

Input File for the WD Code

• No of Parameters: 35

• Depends on Reflection, rotation and other parameters for the star

```
|N1|N2|PERIOD|THE|VUNIT|PHN|PHSTRT|PHSTOP|PHIN
xxxxx|x.xxx|xxx.xxx|x.xxx|xx.xx|xxxx.xxxx|xxxx.xxxx
97037|0.000|100.000|0.245|-0.10|0001.1000|0000.0100
F1|F2|V(GAMA)|PSHIFT|Inc.|G1|G2
x|xx.xxx|xx.xxx|xxx.xxx|x.xxxx|xx.xxx|xx.xxx|xx.xxx
0|01.000|01.000|000.000|0.0000|77.780|00.900|00.500
```

Java – Platform Independent

• Problem with distributing executable programs from web pages: Computer programs are very closely tied to the specific hardware and operating system they run.

• Java solves the problem of platform-independence by using byte code. Java is a platform for application development.

• The Java compiler does not produce native executable code for a particular machine like a C compiler would. Instead it produces a special format called byte code.

• Unlike machine language Java byte code is exactly the same on every platform.

• The interpreter reads the byte code and translates it into the native language of the host machine
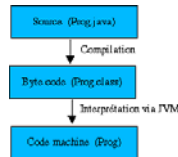
Interface

Java Interface will be a graphical interface

Accept the value in Text Boxes
<there will be default values that are set…>
<If a User Enters a Value the validity of that value will be tested
For example : Mode has to be less than 99 and a whole number>

When the mouse points on the input field, it gives a description of the input field
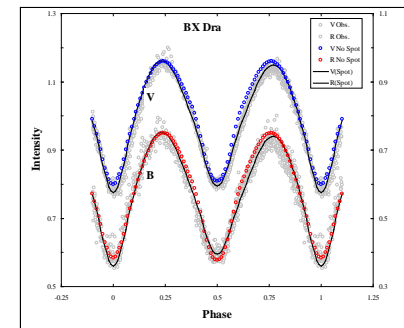
For Example:
VUNIT: Unit for radial velocity input and output

Steps

• Java Program creates the Input File

• Fortran Program Executes the WD code using the input file and creates the output file

• The Java Program reads this output file and creates a graph

How is it used?

Users familiar with the Wilson-Devinney (WD) Model who have access to the web can go to the appropriate link to work with the WD Program. They can use the WD program's Java Interface for learning how to use the WD Program to mathematically model eclipsing binary stars.

The Advantages:

1. The User can use any computer platform (Unix / Windows / Mac)

2. The User is not restricted to any research or teaching laboratory on campus

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