

Variation of the
nutation
movement in
Averrhoa
carambola

Baptiste Rouger

Introduction

Averrhoa carambola
Nutation movement
Scientific question

Regulation system

Arduino system
Peripherals

Analysis

Getting the trajectory
Correcting the
deviation
Wavelet analysis

Results

at 24 °C
at 22 °C
at 28 °C

Conclusion

Thanks

Variation of the nutation movement in *Averrhoa carambola*

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13, April 2018

What is *Averrhoa carambola* ?

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What is nutation ?

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- Does the nutation synchronizes with the day/night cycle ?
- Is the nutation influenced by the temperature ?
- Is the nutation influenced by the light cycle ?

The Arduino system

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My system

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Devices

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Picture setup

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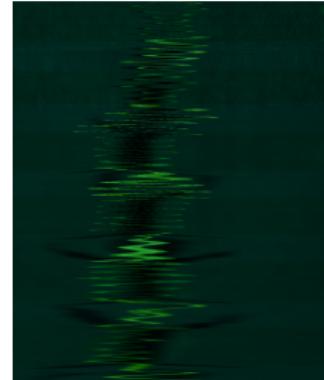
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The trajectory

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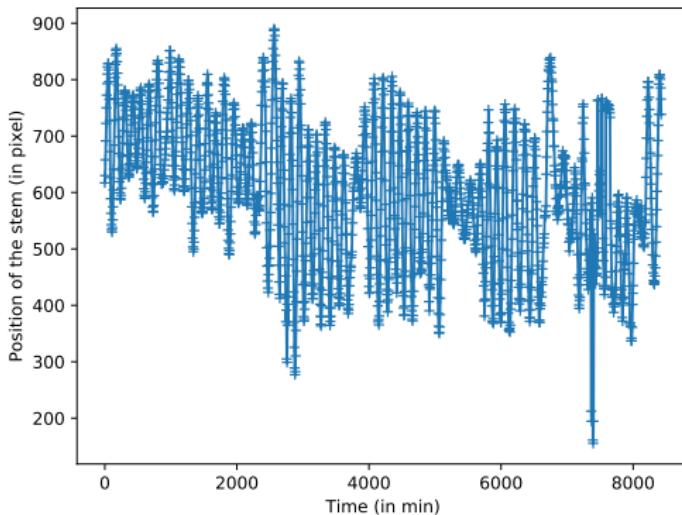
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Correction with linear regression

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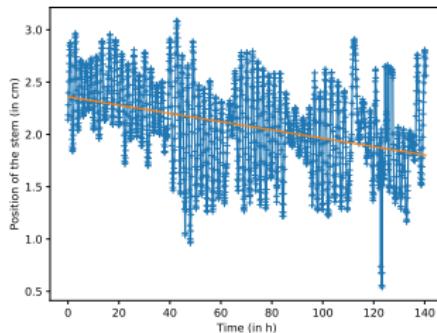
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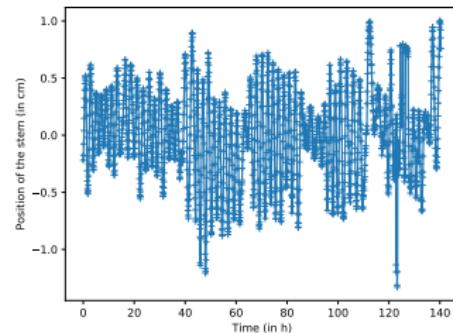
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Raw trajectory with the linear regression



Corrected trajectory

Presentation of the wavelet analysis

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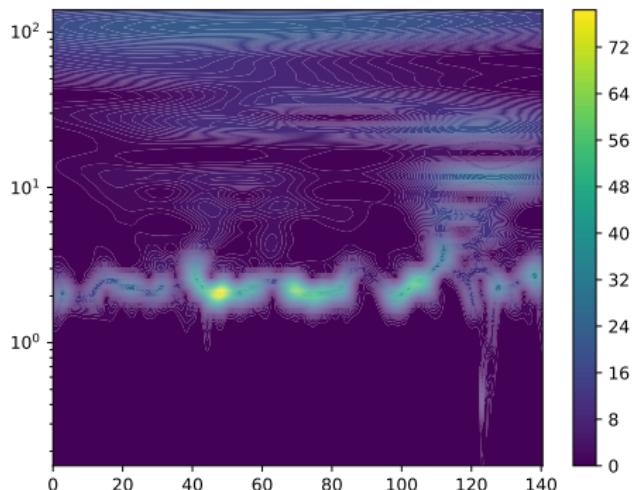
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Powergraph of the wavelet analysis

Result of the Wavelet Analysis

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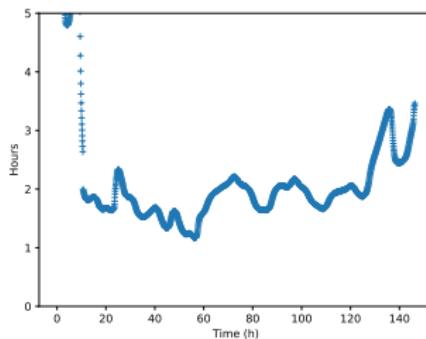
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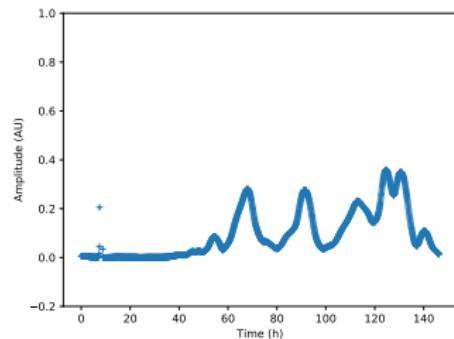
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Period of the nutation



Amplitude of the nutation

24 °C

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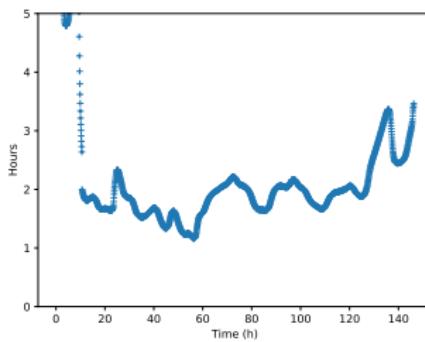
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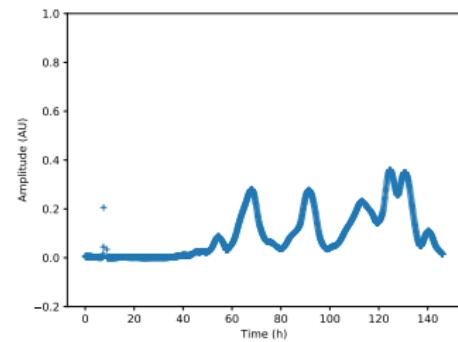
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Period of the nutation at
24 °C



Amplitude of the nutation
at 24 °C

22 °C

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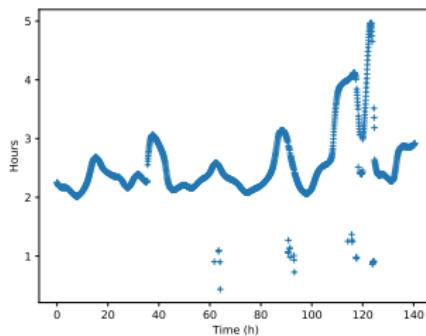
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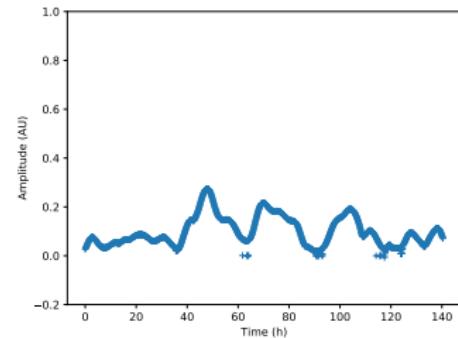
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Period of the nutation at
22 °C



Amplitude of the nutation
at 22 °C

28 °C

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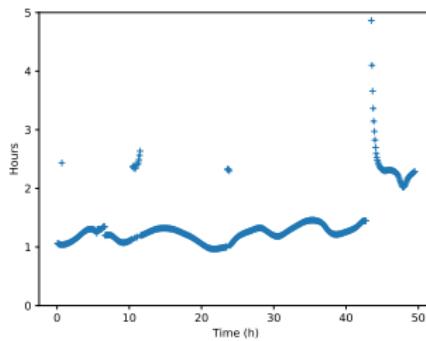
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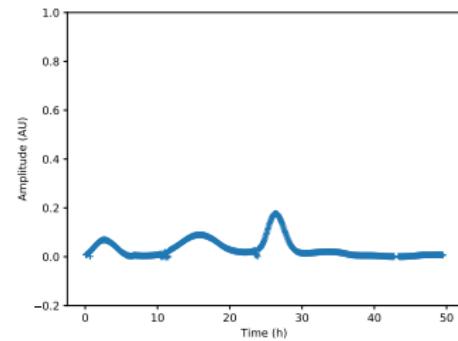
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Period of the nutation at
28 °C



Amplitude of the nutation
at 28 °C

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Period of nutation



when Temperature



Amplitude of nutation



when Temperature



-
- Do more replicate to observe more general behaviour
 - Try with different photoperiods, cycles of temperature...

Thanks

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