

DOUBLE STAR MEASUREMENTS IN INDUS AND TUCÁN

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ABSTRACT:

This report details the results of 16 double star measurements performed between October and November 2021 in the constellations Indus and Tucan, the purpose of the measurements being to update the position angle (θ) and angular separation (ρ) values.

METHODOLOGY:

The pairs were discovered during the 19th and 20th centuries. For the measurements I used a 150/750 Newtonian telescope and a Logitech C270 camera to capture images with a resolution of 0.7728" per pixel and frame size of 1280 x 720, driven by SharpCap Version 3.1 software.

For each measurement, a 15-second video was recorded, obtaining 250 frames for each pair, totaling 80 videos of 5 single captures on different nights, obtaining a total of 20,000 frames.

The 5 captures of each pair were processed with Reduc Version 5.39, a free analysis software developed by the French astronomer Florent Losse.

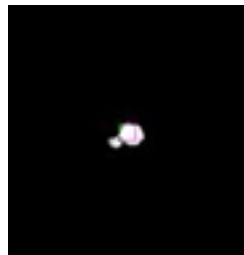
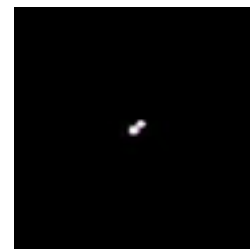
The captures were made with the Lucky Imaging Method, since they were made with a Dobson mount without tracking so that the field of view remains fixed while the pair is drifting.

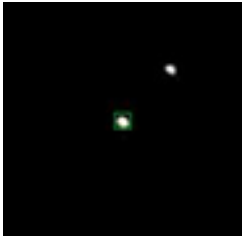
This Lucky Imaging Method consists of recording the video of the pair drift and then decomposing it into its component frames and measuring each one of them, a task that Reduc does automatically, discarding between 30% and 60% of the frames to reduce distorting values, although not all the measurements were automatic because several times they had to be done manually because the pair was very close or the secondary component was not visible at first sight because it was too faint.

The choice of the double stars to be measured was made on the basis of those in the WDS Catalog, and taking into account the limitations of the equipment used and the conditions of the sky where they were taken, only those with a separation greater than 3" and maximum magnitudes of 9 for the principal component and 11 for the secondary component were selected.

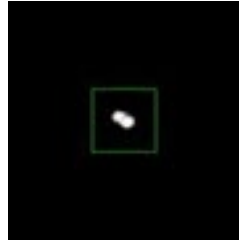
Table 1: Table of Measurements.

WDS	NAME	NUMBER OF HISTORICAL MSRMNTS AND YEARS OF FIRST AND LAST MSRMNTS	POSITION ANGLE AND SPACING RECORDED IN WDS	MAGNITUDE	MEASURED POSITION ANGLE AND ERROR	MEASURED SEPARATION AND ERROR	NUMBER OF MSRMNTS PERFORMED	AVERAGE DATE OF MEASUREMENTS
22237-7248	HJ5325AB	28 1835 – 1999	267.00° – 18.940''	7.96 – 8.40	267.7°± 0.6°	19.02'' ± 0.2''	5	2021.815
21199-5327	HJ5258AB	15 1834 – 2015	269.40° – 7.291''	4.50 – 6.93	272.0°± 4.7°	5.95'' ± 0.73''	5	2021.817
21104-5434	HJ5246	19 1836 – 2019	132.40° – 4.174''	7.79 – 8.01	134.7°± 2.5°	3.40'' ± 0.34''	5	2021.812
21101-4851	HJ5247	19 1834 – 2019	186.70° – 28.359''	8.63 – 8.87	186.7°± 0.4°	28.42'' ± 0.20''	5	2021.856
20574-5905	COO241	80 1914 – 2015	259.50° – 4.639''	8.50 – 9.04	260.0°± 3.0°	3.70'' ± 0.27''	5	2021.805
<u>23476-6031</u>	<u>COO261</u>	19 1900 – 2015	100.10° – 5.732''	8.97 – 9.24	101.3°± 1.8°	5.17'' ± 0.35''	5	2021.856
<u>23397-6912</u>	<u>R348</u>	20 1870 – 2015	347.60° – 5.365''	8.55 – 9.65	347.0°± 3.9°	3.93'' ± 0.68''	5	2021.792
<u>23086-5944</u>	<u>DUN245</u>	27 1826 – 2016	289.70° – 13.610''	7.45 – 9.44	289.0°± 0.9°	13.59'' ± 0.26''	5	2021.831
<u>22437-6439</u>	<u>R339</u>	16 1873 – 2015	248.80° – 10.780''	8.81 – 10.08	250.0°± 1.2°	10.86'' ± 0.19''	5	2021.866
<u>22195-6048</u>	<u>HJ5323</u>	27 1834 – 2015	203.90° – 26.521''	8.39 – 8.74	204.3°± 0.4°	26.60'' ± 0.22''	5	2021.836
<u>00547-6528</u>	<u>HJ3408</u>	20 1836 – 2015	214.10° – 16.093''	8.01 – 9.52	215.3°± 0.8°	16.31'' ± 0.29''	5	2021.823
<u>00530-6105</u>	<u>GLI4</u>	27 1851 – 2019	70.40° – 5.834''	8.41 – 8.77	71.2°± 1.9°	5.10'' ± 0.39''	5	2021.821
<u>00524-6930</u>	<u>DUN2</u>	37 1834 – 2015	81.50° – 20.426''	6.70 – 7.35	82.7°± 0.4°	20.53'' ± 0.17''	5	2021.821
<u>00315-6257</u>	<u>LCL119AC</u>	52 1826 – 2015	167.80° – 27.150''	4.28 – 4.51	167.8°± 0.7°	27.09'' ± 0.14''	5	2021.830
<u>00076-6038</u>	<u>I434</u>	13 1911 – 2015	30.30° – 5.393''	8.51 – 10.93	31.9°± 10.6°	5.01'' ± 0.29''	5	2021.882
<u>00006-6641</u>	<u>GLI289</u>	19 1851 – 2017	274.70° – 3.839''	7.69 – 9.17	273.5°± 6.1°	3.04'' ± 0.60''	5	2021.870

IMAGES OF MEASURED DOUBLE STARS**WDS 22237-7248 (HJ5325AB)****WDS21199-5327 (HJ5258AB)****WDS21104-5434 (HJ5246)**



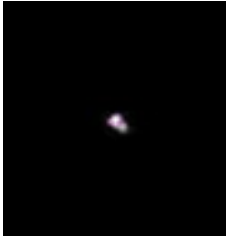
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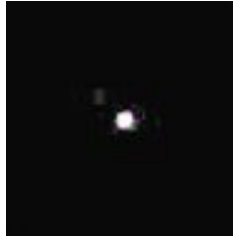
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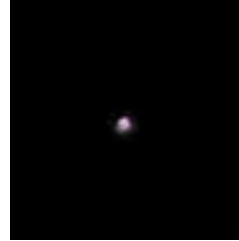
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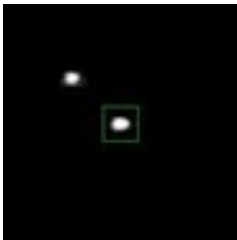
WDS 23397-6912 (R348)



WDS 23086-5944 (DUN245)



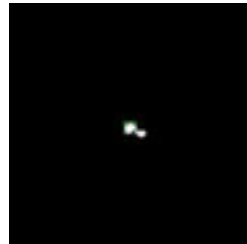
WDS 22437-6439 (R339)



WDS 22195-6048 (HJ5323)



WDS 00547-6528 (HJ3408)



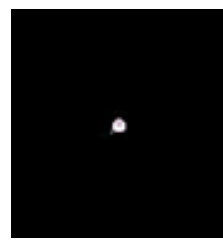
WDS 00530-6105 (GLI4)



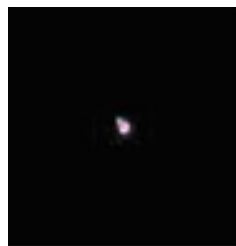
WDS 00524-6930 (DUN2)



WDS 00315-6257 (LCL119AC)



WDS 00076-6038 (I434)



WDS 00006-6641 (GLI289)

CONCLUSIONS:

The values resulting from the measurements are within the average standards of the existing records in the WDS.

The values of the last measurements of the chosen pairs were updated on an average of approximately 7 years

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(<https://youtu.be/Tlqr2wHpb8c>)

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([file:///E:/Users/Usuario/Documents/Curso%20de%20Astronom%C3%ADa/10%20Astrometr%C3%ADa/Estrellas%20Dobles%20y%20Variables/Estrellas%20Dobles/Revista%20El%20Observador%20de%20Estrellas%20Dobles/El%20Observador%20de%20Estrellas%20Dobles%20N%C2%BA%2018%20\(Enero-Junio%20de%202017\).pdf](file:///E:/Users/Usuario/Documents/Curso%20de%20Astronom%C3%ADa/10%20Astrometr%C3%ADa/Estrellas%20Dobles%20y%20Variables/Estrellas%20Dobles/Revista%20El%20Observador%20de%20Estrellas%20Dobles/El%20Observador%20de%20Estrellas%20Dobles%20N%C2%BA%2018%20(Enero-Junio%20de%202017).pdf))

ACKNOWLEDGMENTS:

The present measurements were made using the Washington Double Star (WDS) Catalog, which is operated by the U.S. Naval Observatory

(<http://www.astro.gsu.edu/wds/wdstext.html>)

Losse Florent, Reduc Software (www.astrosurf.com/hfosaf/uk/tdownload.htm#reduc)

JDSO (Double Star Journal Observations), general information and archives

(<http://www.jdso.org/>)