# Time That Star!



## Day 2 Binary Star Data

## Summary

Use the following data to perform Epoch Folding to determine the rotation period or the orbital period of the given sources.

## Stellar Rotation Data

The following two data sets can tell astronomers how fast a star is rotating.

#### Cen X-3 Data

These data for Cen X-3 are rom EXOSAT satellite’s Medium Energy experiment. All data are from 19 June 1985. The time is in seconds from the beginning of that day.

|  |  |
| --- | --- |
| **Time (Seconds)** | **Rate (counts/cm2/s)** |
| 0 | 14.7062277 |
| 0.484 | 14.8695928 |
| 0.968 | 15.8992848 |
| 1.452 | 15.7533336 |
| 1.936 | 16.1208738 |
| 2.42 | 15.66 |
| 2.904 | 16.5468258 |
| 3.388 | 15.211294 |
| 3.872 | 15.5961072 |
| 4.356 | 15.3717151 |
| 4.84 | 14.7062277 |
| 5.324 | 14.8695928 |
| 5.808 | 15.8992848 |
| 6.292 | 15.7533336 |
| 6.776 | 16.1208738 |
| 7.26 | 16.5247452 |
| 7.744 | 16.5468258 |
| 8.228 | 15.211294 |
| 8.712 | 15.5961072 |
| 9.196 | 15.3717151 |

#### GX 301-2 Stellar Rotation Data

These data for GX 301-2 are from the A2 experiment aboard the HEAO-1 satellite. All data are from 1 February 1978. The time is in seconds from the beginning of that day.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Time (Seconds)** | **Rate (counts/cm2/s)** | **Time (Seconds)** | **Rate (counts/cm2/s)** | **Time (Seconds)** | **Rate (counts/cm2/s)** |
| 72362.10 | 0.01388 | 73027.70 | 0.01953 | 73857.14 | 0.03258 |
| 72387.70 | 0.01512 | 73053.30 | 0.01688 | 73882.74 | 0.03518 |
| 72413.30 | 0.01593 | 73099.38 | 0.02005 | 73908.34 | 0.04642 |
| 72438.90 | 0.02347 | 73145.46 | 0.02447 | 73933.95 | 0.04945 |
| 72464.50 | 0.03103 | 73171.06 | 0.03435 | 73959.54 | 0.04190 |
| 72490.10 | 0.03113 | 73196.66 | 0.03123 | 73985.14 | 0.04512 |
| 72515.70 | 0.03387 | 73222.27 | 0.04637 | 74010.74 | 0.04933 |
| 72541.30 | 0.03270 | 73247.86 | 0.04983 | 74036.34 | 0.04593 |
| 72566.90 | 0.04195 | 73273.46 | 0.04498 | 74061.95 | 0.04435 |
| 72592.50 | 0.04873 | 73299.06 | 0.04375 | 74087.54 | 0.03997 |
| 72618.10 | 0.03942 | 73324.66 | 0.03735 | 74113.14 | 0.04358 |
| 72643.70 | 0.04453 | 73350.27 | 0.03998 | 74138.74 | 0.03462 |
| 72669.30 | 0.03557 | 73375.86 | 0.03278 | 74164.34 | 0.02330 |
| 72694.90 | 0.03318 | 73401.46 | 0.03377 | 74189.95 | 0.01715 |
| 72720.50 | 0.03347 | 73427.06 | 0.02837 | 74215.54 | 0.01945 |
| 72746.10 | 0.03520 | 73452.66 | 0.02468 | 74241.14 | 0.02760 |
| 72771.70 | 0.02420 | 73478.27 | 0.01903 | 74266.74 | 0.03603 |
| 72797.30 | 0.01890 | 73503.86 | 0.01927 | 74292.34 | 0.03190 |
| 72822.90 | 0.02057 | 73590.90 | 0.03228 | 74317.95 | 0.03705 |
| 72848.50 | 0.02873 | 73677.95 | 0.03677 | 74343.54 | 0.03342 |
| 72874.10 | 0.02737 | 73703.54 | 0.02440 | 74369.14 | 0.02537 |
| 72899.70 | 0.03315 | 73729.14 | 0.01590 | 74394.74 | 0.02307 |
| 72925.30 | 0.03692 | 73754.74 | 0.02042 | 74420.34 | 0.01768 |
| 72950.90 | 0.03377 | 73780.34 | 0.01408 | 74445.95 | 0.01930 |
| 72976.50 | 0.03375 | 73805.95 | 0.01908 | 74471.54 | 0.01730 |
| 73002.10 | 0.02500 | 73831.54 | 0.02345 |  |  |

## Orbital Rotation Data

The following two data sets can tell astronomers how fast two stars are orbiting each other.

#### Cir X-1 Orbital Data

These data for Cir X-1 are from the RXTE Satellite’s All Sky Monitor. The time is the number of days from the beginning of the mission.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Time (Days)** | **Rate (counts/s)** | **Time (Days)** | **Rate (counts/s)** | **Time (Days)** | **Rate (counts/s)** |
| 186.0 |  93.55 | 205.0 |  71.92 | 224.0 |  76.04 |
| 187.0 | 105.36 | 206.0 |  75.87 | 225.0 |  37.82 |
| 188.0 |  97.05 | 207.0 |  81.32 | 226.0 |  99.55 |
| 189.0 |  85.28 | 208.0 |  70.23 | 227.0 | 171.93 |
| 190.0 |  88.64 | 209.0 |  76.63 | 228.0 | 141.79 |
| 191.0 |  88.60 | 210.0 | 163.11 | 229.0 | 125.30 |
| 192.0 |  60.92 | 211.0 | 195.43 | 230.0 | 101.67 |
| 193.0 | 121.83 | 212.0 | 154.57 | 231.0 |  81.85 |
| 194.0 | 170.94 | 213.0 | 110.34 | 232.0 |  74.14 |
| 195.0 | 177.16 | 214.0 | 105.15 | 233.0 |  87.63 |
| 196.0 | 113.90 | 215.0 |  86.03 | 234.0 | 101.00 |
| 197.0 |  82.20 | 216.0 | 114.17 | 235.0 |  97.89 |
| 198.0 |  97.48 | 217.0 | 125.39 | 236.0 |  83.97 |
| 199.0 | 120.72 | 218.0 | 112.97 | 237.0 |  85.34 |
| 200.0 | 109.35 | 219.0 |  90.32 | 238.0 |  77.82 |
| 201.0 |  75.39 | 220.0 |  75.04 | 239.0 |  76.74 |
| 202.0 |  71.62 | 221.0 |  85.32 | 240.0 |  73.02 |
| 203.0 |  70.81 | 222.0 |  70.34 | 241.0 |  74.61 |
| 204.0 |  63.48 | 223.0 |  77.66 |  |  |

#### GX 301-2 Orbital Data

These data for GX 301-2 are from the Vela 5B satellite. The time is the number of days from the beginning of the mission.

|  |  |  |  |
| --- | --- | --- | --- |
| **Time (Days)** | **Rate (counts/s)** | **Time (Days)** | **Rate (counts/s)** |
| 41001.46 | 5.194 | 41087.55 | 4.008 |
| 41006.13 | 1.274 | 41092.22 | 0.407 |
| 41010.73 | 1.971 | 41096.88 | 0.522 |
| 41017.69 | 1.313 | 41103.66 | 0.164 |
| 41022.35 | 1.441 | 41107.27 | 0.187 |
| 41025.93 | 0.501 | 41113.02 | 0.173 |
| 41033.92 | 1.784 | 41117.71 | 0.302 |
| 41038.59 | 0.119 | 41122.36 | 10.349 |
| 41043.27 | 11.225 | 41127.03 | 1.128 |
| 41047.95 | 1.199 | 41132.80 | 0.478 |
| 41052.64 | 0.386 | 41137.50 | 0.786 |
| 41057.30 | 0.256 | 41143.28 | 1.999 |
| 41061.98 | 2.442 | 41147.95 | 1.843 |
| 41066.65 | 0.126 | 41152.64 | 1.605 |
| 41071.32 | 1.712 | 41157.27 | 0.304 |
| 41075.98 | 0.305 | 41161.96 | 5.784 |
| 41082.73 | 7.988 | 41166.64 | 5.509 |