

HW 3, #3

Download a set of stars from Gaia DR3, using the query provided.

Q1: see graphs "hist-a.png", "hist-b.png"

Q2: the peak in the histogram occurs near

$$\pi \approx 1.0 \text{ mas}$$

Q3: Therefore, the distance to this cluster must be

$$d \approx \frac{1000 \text{ mas} \cdot \text{pc}}{\pi} \approx 1000 \text{ pc}$$

Q4: If we select stars with

$$0.90 \leq \pi \leq 1.1 \text{ mas}$$

then

$$1111 \geq d \geq 909 \text{ pc}$$

See HR diagram in graph "c"

Bonus: based on the $(\text{RA}, \text{Dec}) = (105.65, -8.383)$, this is open cluster NGC 2323 = M50. A very interesting paper about this cluster, "Unveiling the binary nature of NGC 2323," [Songmei et al., A&A 693, A317 (2025)], claims this is two clusters very close together.

See finding chart/photo in "m50_dss.png"