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HIPPARCOS Discussion

The discussion of the six papers dealing with binary star astrometry and photometry from HIPPARCOS was delayed until after these papers were presented. The following combined discussion, chaired by J. Dommanget, took place.

LATHAM: When will an electronic or machine–readable version of the input catalog be available?

BERNACCA: Since the printed version is now available, I do not see reasons why the machine–readable version should not. I suggest you ask Catherine Turon, Team Leader of the Input Catalog Consortium (Observatoire de Paris–Meudon) for precise information.

CHEN: I must have missed something basic. Isn't it true that the configuration of a pair can be determined with two scans?

MIGNARD: In principle, two well–separated scans are sufficient to determine a pair configuration provided its separation is less than one gridstep. In practice, we are left with infinitely many equally acceptable solutions, each of them with an acceptable standard deviation.

POPPER: Can you describe for us the relation between the Tycho B,V photometric system and the standard (Johnson) system?

HALBWACHS: The Tycho system, defined by the B_T and V_T bands, turns out to be very close to the B,V photometric system. Photon counts collected by the satellite are calibrated against a set of photometric standard stars of well–known magnitude and color. This ensures that Tycho magnitudes will be known in a well–defined photometric system closely related to the classical one.

POVEDA: Can you please comment on the relative accuracies of parallax determination between HIPPARCOS and modern ground–based techniques with CCD's? Can you also comment on the contribution of HIPPARCOS to improve the lower part of the mass–luminosity relation?

DOMMANGET: First, no, I have not made any comparison of the HIPPARCOS technique with the one you mention. Second, following what I have shown about the region where, in the ($\log P$, $\log a$) diagram, newly–discovered binaries may lead to orbits and masses, it appears that these total masses would be somewhat less than 0.5 or 0.6 $\mathcal{M}_\odot$. But only HIPPARCOS will tell us precisely how far lower some new masses may be discovered.

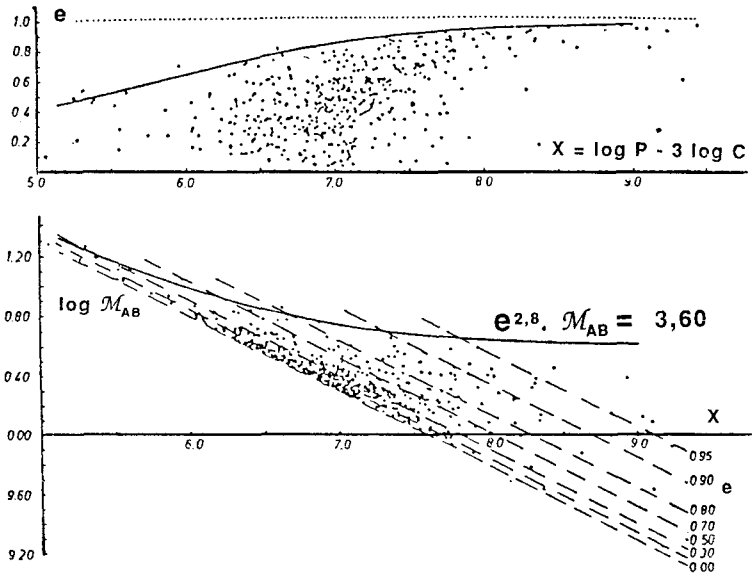
ZINNECKER: Regarding the frequency of true separations, new information from HIPPARCOS would be very useful. Is the sample to be studied complete?

DOMMANGET: The HIPPARCOS Input Catalog has been established following given needs, that should be taken into account in any further statistical research based on the mission's results. Concerning double stars, the Gliese–Jahreiss catalog — which is entirely included in the *Input Catalog* — is not complete, but one may expect that it will be very much improved by the discovery of many duplicities of known nearby stars and by very wide new components. Some new nearby binaries will probably also be added.

McALISTER: First, I wish to encourage early release of at least some HIPPARCOS double star results, particularly for new discoveries. Confirmation by ground-based methods will not only lead to increased credibility in HIPPARCOS' ability to discover binaries, but will also provide the opportunity to begin necessary follow-up observations that will lead to orbits. Second, how well will parallaxes be determined for closer binaries with overlapping transfer functions?

MIGNARD: The HIPPARCOS policy concerning the early data release is undergoing major revisions toward more flexibility. A simple but still formal procedure will be set up to allow research proposals between groups involving both HIPPARCOS and non-HIPPARCOS related persons. Obviously, new ground-based observations planned with the help of HIPPARCOS information fall in this category. In answer to the second question, for close binaries ($\rho \leq 0''.05$), the parallax solution will be quite as good as for the single stars, i.e. $\pm 0''.002$. For larger separations ($\rho \geq 0''.4$), the astrometric and photometric solution is a prerequisite before the parallax is properly determined. There will be additional error, but at the moment we are optimistic that it could be kept small.

DOMMANGET: As a complement of what has been said in the interesting papers we heard yesterday and this morning, I want to mention a research effort I made 30 years ago on double-star evolution by mass-loss. This research gave me the opportunity to explain the period-eccentricity correlation. But in the meantime, I established the diagram shown here which may be considered independently of any opinion about the reality of any mass-loss. It shows an upper limit of the eccentricity that can be expressed by $e^{2.8}\mathcal{M}_{AB} = 3.60$ and which should be considered by any theory of the formation and evolution of double stars. Originally based on 500 orbital pairs in 1963, this diagram is now supported on the basis of nearly 800 systems with orbits.



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