INTRODUCTION

The lists of stars selected spectroscopically by Vysotsky (1963) at the McCormick Observatory and the 4th version of the Catalogue of Nearby Stars (CNS4) are two major sources of nearby late-type dwarfs, which complement each other. In addition to the 800 McCormick (MCC) K-M dwarfs brighter than ~12 mag, the CNS4 (see, e.g., Jahnke & Wielen 2000) includes all similar dwarfs believed to be within 25 pc of the Sun that appear to be missed in the former source. These two sources of stars, being limited in magnitude and distance, respectively, should be free of the high-proper-motion selection effect. With the advent of the Hipparcos and Tycho-2 catalogues the samples of MCC and CNS4 stars have become the most comprehensive for stars from which kinematically unbiased information for the lower main sequence stars in the immediate solar neighborhood. Until recently, however, the main limitation in observational data for both samples was the lack of well-determined radial velocities, especially for fainter magnitude stars. Therefore our first goal was to perform CORAVEL observations for one-third of the ~1400 MCC and CNS4 K-M dwarfs which had no accurate or any radial velocity data.

Fig. 1. Distribution in the sky of the K-M dwarfs within 25 pc, which have accurate radial velocity data, including measurements obtained during the course of our program. Red points represent MCC stars and yellow points represent stars from CNS4. Note the incompleteness among the sample in the deep southerly declinations.

Fig. 2. Distribution of V magnitude for the combined MCC and CNS4 sample.

Fig. 3. M_B - V diagrams for the subsamples of MCC and CNS4 stars. Only stars with the relative parallax error <15% are considered. Error bars for M_B are not shown because of their small size.

The space velocity components have been calculated with respect to the Sun. A summary of the kinematical information on the MCC and CNS4 subsamples and on the whole sample of 1262 stars is given in the table. The mean velocities and the velocity dispersions indicate that the CNS4 sample is, to some extent, kinematically biased, a consequence of inclusion in this catalogue of nearby stars from high-proper-motion surveys.

For the U- and V-components of the peculiar motion of the Sun with respect to the LSR, the kinematically unbiased sample of MCC stars gives the values 9.3±1.3 km/s and 6.9±0.7 km/s, respectively. No attempt was made at this stage of work to determine the component V of the LSR. The distribution of the V-velocity (Fig. 4) clearly shows the presence of different age populations dominating the distribution in different regions of the asymptotic drift: the young disk component showing no lag behind the motion of the Sun, the intermediate age component with the central peak at the asymptotic drift $V_\text{rot} = 10$ km/s (if to assume the Sun’s motion relative to the LSR $V_\text{LSR} = 6$ km/s), and the old disk population with the largest rotational lag. The stars which make up an asymptotic tail to the left of the dip at $V_\text{rot} = 35$ km/s might plausibly be assigned to the thick disk component.

Selection effects are still rife within both stellar samples. Therefore the next step will be to evaluate the completeness of each of the sample and to evaluate the Malmquist and Lutz-Kelker biases inherent in each group. Hopefully, age related stellar measures will also be provided in a later phase of the program.

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Fig. 4. Distribution of the velocity component V for the CNS4 and MCC stars and for the combined sample.