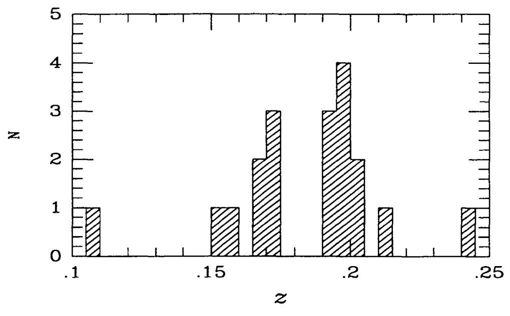
STUDY OF THE GALAXY DISTRIBUTION IN THE SYSTEM OF CLUSTERS A2534–A2536

César A. Caretta[1] and Márcio A.G. Maia[1]

There are, in the constellation of Aquarius, two concentrations of Abell clusters, named SC-16 and SC-17, respectively the second and third richest fields in Abell (1961) supercluster list. The great projected density of clusters in an area of 10×6 degrees suggests that several of them may be part of a huge bounded complex. As a part of the study of this region, we examine the structure of the system composed by the clusters A2534 and A2536, members of SC-16. These clusters are apparently connected by a bridge in their projected image, and are considered to be almost at the same distance since they have similar estimated redshifts. We have digitized a B_J ESO plate with a PDS 1010A measuring machine to study the projected distribution of galaxies in this field, which revealed four statistically meaningful enhanced surface-density regions forming the system: the two main clusterings, the bridge and another substructure next to A2536. The existence of these substructures and the irregular and flattened shape of the main clusterings suggest that the system is dynamically young. Based on observations carried out at LNA/CNPq (Brazil) and at CASLEO (Argentina) we obtained 18 new radial velocities for galaxies of the four substructures. The redshift histogram shows two distinct clusterings in the radial direction, as two planes, respectively at $z \approx 0.17$ and 0.20. Both of them have dispersions of approximately 1000 km s^{-1}, consistent with the expected dispersions for clusters of galaxies. However, it seems that there is not a relation between the two-dimensional substructures and the radial planes, since $z \approx 0.17$ and 0.20 are found in all the structures. We are currently undertaking to obtain measurements of more radial velocities of this system.



[1]Observatório Nacional (CNPq), Rio de Janeiro (RJ), Brazil

ORBITAL CLASSIFICATION IN 2 DIMENSIONS

Daniel D. Carpintero[1,2] and Luis A. Aguilar[1]

Based on the Fourier analysis technique and the fact that regular orbits are periodic or quasi-periodic, we developed an algorithm that classifies orbits generated in arbitrary, time independent 2-D potentials. The program is able to distinguish between regular orbits (two or three isolating integrals of motion) and irregular orbits (one integral). Moreover, when a regular orbit is classified, the program further determines whether it is a loop, a box, or a boxlet, and whether it is closed or not. If the orbit turns out to be a boxlet, our algorithm can also determine the resonance to which it belongs. Our procedure does not require the coordinate system to be aligned or centered with the potential's principal axes or center, respectively.

The distinctive property of regular orbits, exploited by our procedure, is the fact that they are periodic or quasi-periodic, and thus the Fourier Transform of the time series of their spatial coordinates is line-like. In fact, all lines should represent linear combinations of at most two fundamental frequencies: two for an open orbit and one for a closed one. A non line-like Fourier spectrum, on the contrary, signals an irregular orbit.

A regular orbit can be further classified depending on the ratio of its two fundamental frequencies: if these are incommensurable we have a box orbit, if they are commensurable and different it is a boxlet, finally, if the fundamental frequencies in each coordinate are the same, it is a loop orbit.

As it stands, the algorithm is directly applicable to any orbit, provided that a sufficient number of points are sampled ($> 10^3$), spanning some fifty orbital times. Although this ensures a correct classification, the program can also deal with less sampled orbits, althought this could result in a misclassification. In this case, however, the classifier signals a warning to the user.

[1]Instituto de Astronomía, Universidad Nacional Autónoma de México, Ensenada, B.C., México.

[2]Universidad Nacional de La Plata, Argentina