formation to understand the physical processes of galaxy formation and evolution. Within the context of the popular Λ Cold Dark Matter (ΛCDM) hierarchical scenario, dark matter halos are the sites where galaxies form and evolve (White & Rees 1978; White & Frenk 1991). Hence, a connection between *GBMF* or *GSMF* and the halo mass function (*HMF*) is expected. The result of such a connection is the galaxy stellar and baryonic mass-halo mass relations, $M_{\rm s}$–$M_{\rm h}$ and $M_{\rm b}$–$M_{\rm h}$, and their intrinsic scatters, both set by complex dynamical and astrophysical processes intervening in galaxy formation and evolution (see for recent reviews Baugh 2006; Avila-Reese 2007; Benson 2010). In this sense, the $M_{\rm b}/M_{\rm h}$ and $M_{\rm s}/M_{\rm h}$ ratios quantify the efficiency at which galaxy and star formation proceeds within a halo of mass $M_{\rm h}$. Therefore, the empirical or semi-empirical inference of the $M_{\rm b}$–$M_{\rm h}$ and $M_{\rm s}$–$M_{\rm h}$ relations and their scatters (locally and at other epochs) is nowadays a challenge of great relevance in astronomy.

For simplicity, in statistical studies like those related to the *GSMF*, galaxies are labelled by their mass alone. However, according to their observed properties, correlations, and evolution, galaxies show a very different nature, at least for the two major groups in which they are classified: the rotationally-supported disk star-forming (late-type) and the pressure-supported spheroid quiescent (early-type) galaxies. In the same way, the evolution of galaxies is expected to differ if they are centrals or satellites. The main intrinsic processes of galaxy evolution are associated to central galaxies, while satellite galaxies undergo several *extra* astrophysical processes because of the influence of the environment of the central galaxy/halo system in which they were accreted. Hence, if the $M_{\rm b}$–$M_{\rm h}$ or $M_{\rm s}$–$M_{\rm h}$ relations are used for constraining galaxy formation and evolution processes, these relations are separately required for at least the two main families of late- and early-type galaxies and should take into account whether the galaxy is central or satellite. Fortunately, in the last years there appeared several studies in which a decomposition of complete *GSMF*s by color, concentration or other easily measurable indicators of the galaxy type was carried out (e.g., Bell et al. 2003; Shao et al. 2007; Bernardi et al. 2010). Furthermore, in a recent work Yang, Mo, & van den Bosch (2009, hereafter YMB09) used the Sloan Digital Sky Survey (SDSS) data to obtain the *GSMF*s of both central and central + satellite galaxies separated in each case into blue and red objects.

With the advent of large galaxy surveys, a big effort has been made to constrain the $z \sim 0$ *total* $M_{\rm s}$–$M_{\rm h}$ relation (i) *directly* by estimating halo masses with galaxy-galaxy weak lensing, with kinematics of satellite galaxies or with X-ray studies; and (ii) *indirectly* by linking observed statistical galaxy properties (e.g., the galaxy stellar mass function *GSMF*, the two-point correlation function, galaxy group catalogs) to the theoretical *HMF* (for recent reviews and additional references see Moster et al. 2010; Behroozi, Conroy, & Wechsler 2010, hereafter BCW10; More et al. 2011). While the latter approach does not imply a measure-based determination of halo masses, it is simpler from a practical point of view, as it allows to cover larger mass ranges, and can be extended to higher redshifts than the former approach (see recent results in Conroy & Wechsler 2009; Moster et al. 2010; Wang & Jing 2010; BCW10). Besides, both the weak lensing and satellite kinematics methods in practice are (still) statistical in the sense that one needs to stack large number of galaxies in order to get sufficient signal-to-noise. This introduces a significant statistical uncertainty in the inferred halo masses.

The indirect approach for linking galaxy and halo masses spans a large variety of methods, among which the halo occupation distribution (Peacock & Smith 2000; Berlind & Weinberg 2002; Kravtsov et al. 2004) and the conditional luminosity function formalisms (Yang, Mo, & van den Bosch 2003; Yang et al. 2004) can be mentioned. These formalisms introduce *a priori* functional forms with several parameters that should be constrained by the observations. Therefore, the final inferred $M_{\rm s}$–$M_{\rm h}$ relation is actually model-dependent and yet sometimes poorly constrained due to degeneracies in the large number of parameters. A simpler and more empirical method –in the sense that it uses only the *GSMF* (or luminosity function) as input and does not require to introduce any model– has been found to give reasonable results. This indirect method, called the abundance matching technique (hereafter AMT; e.g., Marinoni & Hudson 2002; Vale & Ostriker 2004; Conroy, Wechsler, & Kravtsov 2006; Shankar et al. 2006; Conroy & Wechsler 2009; Baldry, Glazebrook, & Driver 2008; Guo et al. 2010; Moster et al. 2010; BCW10), is based on the assumption of a monotonic correspondence between $M_{\rm s}$ and $M_{\rm h}$; in the limit of zero scatter in the $M_{\rm s}$–$M_{\rm h}$ relation, the halo mass $M_{\rm h}$ corresponding to a galaxy of stellar mass $M_{\rm s}$, is found by matching the observed cumulative *GSMF* to the theoretical cumulative *HMF*.

In this paper we apply the AMT in order to infer the local $M_{\rm s}$–$M_{\rm h}$ relation for *central blue and red* galaxies separately, which requires as input *both* the