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The RR Lyrae stars play a role in the investigation of many important astronomical problems. For example, the slope of the luminosity - metallicity relation for RR Lyraes in globular clusters leads to relative cluster ages and thus to a chronology of the formation of the galactic halo. However, it is necessary to know fundamental parameters for the RR Lyrae stars, and these remain controversial. The masses of these objects can be determined in a number of ways, including the use of pulsation theory to model the RR_d stars, and the calculation of horizontal branch evolutionary tracks. The RR_d stars pulsate simultaneously in the first overtone and fundamental modes, enabling masses to be inferred from the period ratio vs. period diagram. These masses have the range $0.55 < M/M_\odot < 0.65$, which disagrees with the masses $M/M_\odot \geq 0.70$, determined from recent evolutionary tracks. However, the RR_d masses quoted here depend upon pulsation periods obtained from linear models. Since the mass determination requires very high accuracy in the periods, it is necessary to ask whether the linear periods reflect the true theoretical values (i.e., the nonlinear periods) to the precision necessary. To answer this question, we constructed two hydrodynamic models with canonical RR_d parameters and integrated them for well over 1000 periods in both the fundamental and overtone modes. The period ratios were found to agree with the linear values to within the accuracy required for the RR_d problem. Combining this result with a similar one obtained by Kovacs and Buchler (Ap. J. 324, 1026, 1988), we conclude that linear pulsation models suffice for the determination of RR_d masses.