ASTR 400B: Homework 4

Due on Feb 13, 2020

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1) COM Position and Velocity

These are the results for the three galaxies, using only disk particles:

name	**ptype**	**x**	**y**	**z**	**vx**	**vy**	**vz**	**R**	**V**
		kpc	kpc	kpc	$\mathrm{km\,s^{-1}}$	$\mathrm{km\,s^{-1}}$	$\mathrm{km\,s^{-1}}$	kpc	$\mathrm{km\,s^{-1}}$
MW_000	disk	-2.07	2.95	-1.45	0.94	6.32	-1.35	3.88	6.53
M31_000	disk	-377.66	611.43	-284.64	72.85	-72.14	49.0	772.98	113.63
M33_000	disk	-476.22	491.44	-412.4	44.42	101.78	142.23	798.98	180.45

So for the Milky Way:
The position vector is $\langle -2.07,\ 2.95,\ -1.45 \rangle$ kpc
The velocity vector is $\langle 0.94,\ 6.32,\ -1.35 \rangle$ km/s
Both are small compared with M31 and M33, reflecting the choice of our galaxy as the origin in this sim.

2, 3) Relative Position and Velocity

pairs	**Separation**	**Radial velocity**	**Tangential velocity**
	kpc	$\mathrm{km\,s^{-1}}$	$\mathrm{km\,s^{-1}}$
MW → M31	769.1	-115.85	21.36
M31 → M33	201.08	-150.09	132.69

4) Why Iterate?