

Celestial Sphere simulation

This video is a brief introduction to the Celestial Sphere model using software put out by the Astronomy Department at University of Nebraska.

http://astro.unl.edu/naap/motion2/animations/ce_hc.html

When I open the software, it gives me some random location here, and the first thing I want to do is understand what is being shown here. If I adjust the latitude to 90 degrees, then what you can see is that the north pole of the celestial sphere is straight above my head, just as it would be if I was sitting at the very top of the Earth, at the north pole. What I can do is readjust my position on the earth to be about where I am in Corvallis, Oregon. You can see in this view it shows me where I am now.

This is the celestial sphere. It stays fixed with respect to the earth, and the earth is going to rotate around underneath it. The gold circle is the Celestial equator, that lies above the equator on the earth. Now in my horizon view, it looks like the celestial sphere is tipped with respect to me. My horizon doesn't jive with the horizon of the earth any more. My horizon is what I see, and the equator doesn't lie at my horizon line.

If I start the animation, I see the Earth is rotating underneath the Celestial sphere, and this gold arc is rotating over the top of me. That gold arc sits still with respect to the celestial sphere model and locates the zero hour line, or you could think of it as being the line where midnight falls with respect to the earth. So to me it looks like the sun and all the stars are rotating around me, while in the celestial sphere model, the earth is rotating inside the celestial sphere.

I can show some stars on here, I can put the Big Dipper onto this view. In the celestial sphere view, the Big Dipper sits still on the sphere and the earth is rotating underneath, but to me it looks like the Big Dipper is actually rotating around the North Pole (the north star would be straight above the north pole). I can add Orion, and see that to me, it seems to move around me. In the celestial sphere view, it sits still and Earth rotates. If I add some random star, I can see the celestial sphere start to fill in. The field of stars rotates around in my view. In the celestial sphere view, the field of stars lies on a static sphere, with Earth rotating inside.

When the celestial sphere model was developed, people actually thought the stars were fixed to a giant sphere. Nowadays we know that they actually lie at different distances from us. Still, the model is useful, since it gives us a way to assign addresses to the stars.