How A Four Dimensional Motion Mimics Gravitation

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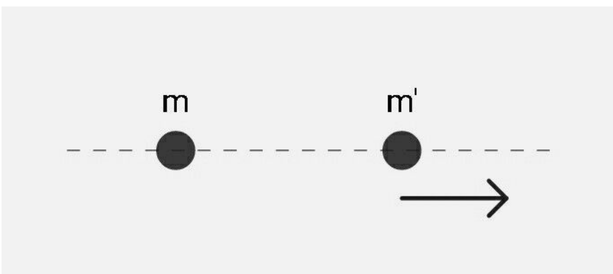
Points to remember

1. An n+1 dimensional motion cannot be pictured in a single n dimensional plane.

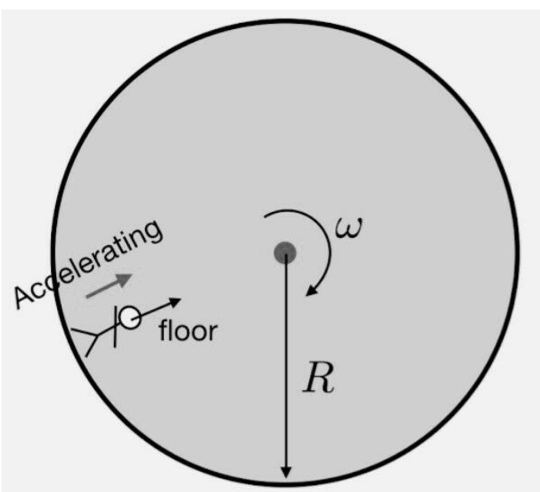
Example: A motion parallel to the z axis cannot be represented in a single (x-y) plane. Similarly, a motion in a 4D frame cannot be pictured in a single 3D $R_{(x,y,z)}$ plane.

2. Motion is always relative, not absolute.

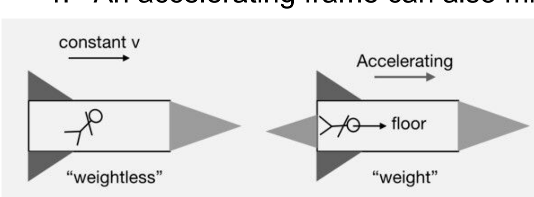
For a mass m' moving away with a velocity v from another mass m, the reference point with which we measure the velocity is fixed at m. If we fix the reference frame at m', the mass m will appear as it is moving away from m' with the same velocity.



3. Centripetal force can mimic the effects of Gravity.



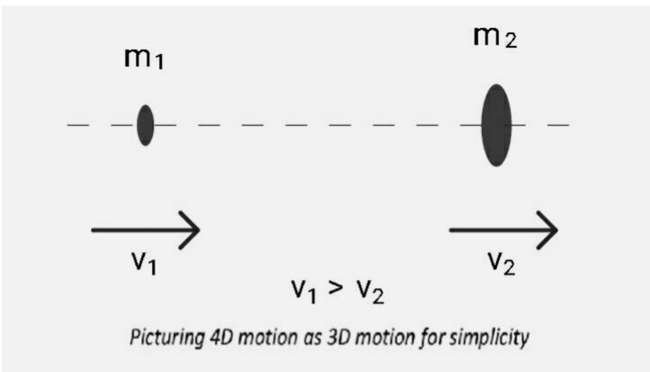
4. An accelerating frame can also mimic the effects of Gravity.



Four Dimensional Motion And Gravitation

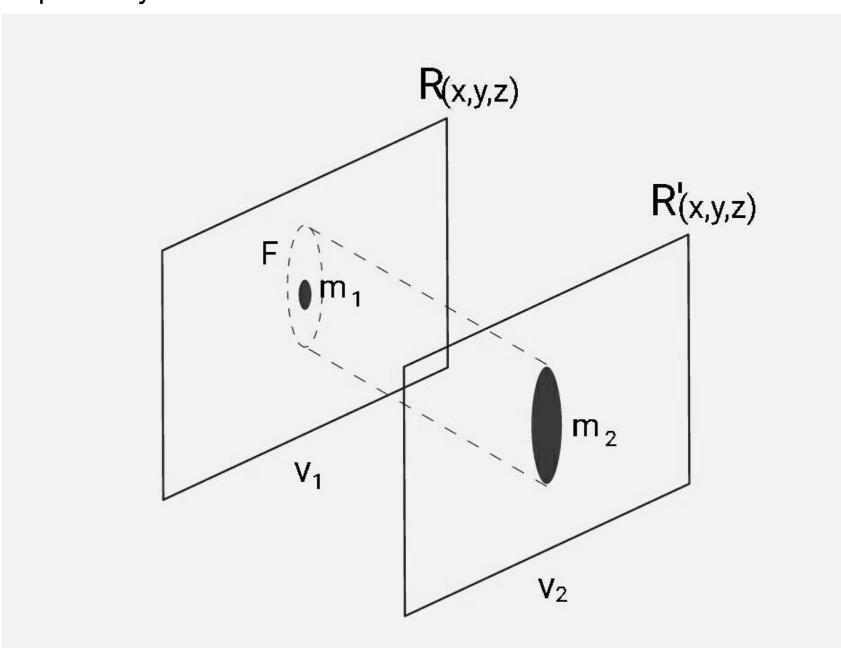
We say 'Light travels with a speed c in free space'. What if it is not the light that travels with a speed c? What if everything in this space is traveling in a four dimensional $R_{(x,y,z)}$-ivt frame instead of the light?
Since a motion in the 4th dimension cannot be observed in a single 3D plane, the difference in velocity of different masses in the 4D space appears as a gravitational pull in the observable 3D space.

Consider the linear motion of two masses m_1 and m_2 in a 4D frame with the velocities v_1 and v_2 respectively.

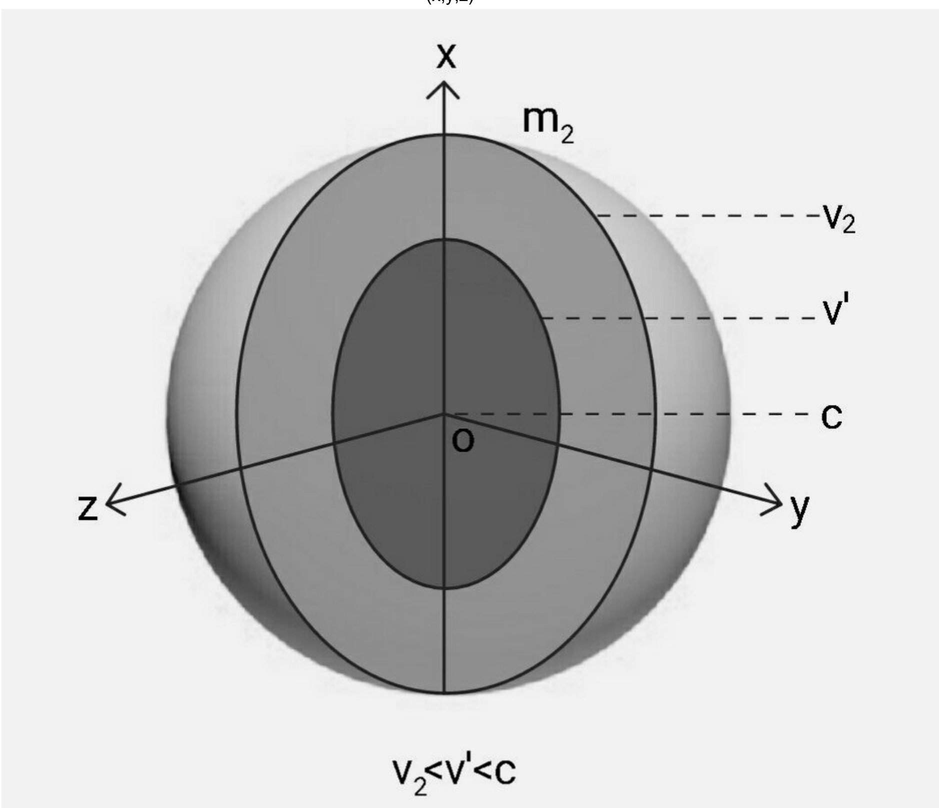


Picturing 4D motion as 3D motion for simplicity

The masses m_1 and m_2 can be represented in a 4 dimensional frame as,
$Xx+Yy+Zz-iv_1t$
$X'x+Y'y+Z'z-iv_2t$
respectively.



The velocity range of different objects lies in between 0 to c depending on the masses of the objects. The heavier the object is, the lesser the 'v' will be.
This velocity difference in the imaginary *velocity-time* space also mimics time dilation in the real 3D plane. So the products v_1t and v_2t always appear as ct_1 and ct_2 near m_1 and m_2 respectively in the real space. Due to this apparent time delay near m_2, the mass m_1 appears as it is moving towards m_2 with an acceleration in the real 3D frame.
The motion possessing a momentum in the imaginary *v-t* frame is completely independent of any movement in the 3D plane. This is why light always appears as it is independent of any frame of references in the real space.
Centripetal force or an accelerating frame mimics the effects of Gravity in the 3D space. Similarly, a velocity difference in the 4^{th} dimension appears as a gravitational pull around every independent objects in the real $R_{(x,y,z)}$ space.



Like a person experiencing artificial Gravity inside an accelerating spacecraft, every layer of a spherical celestial object experiences an inward pull towards the center due to the difference in velocity of different layers.