**[Calculate rotations to look at a 3D point?](http://stackoverflow.com/questions/1251828/calculate-rotations-to-look-at-a-3d-point)**

Here are my working assumptions:

* The coordinate system (x,y,z) is such that positive x is to the right, positive y is down, and z is the remaining direction. In particular, y=0 is the ground plane.
* An object at (0,0,0) currently facing towards (0,0,1) is being turned to face towards (x,y,z).
* In order to accomplish this, there will be a rotation about the x-axis followed by one around the y-axis. Finally, there is a rotation about the z-axis in order to have things upright.

(The terminology yaw, pitch, and roll can be confusing, so I'd like to avoid using it, but roughly speaking the correspondence is x=pitch, y=yaw, z=roll.)

Here is my attempt to solve your problem given this setup:

rotx = Math.atan2( y, z )

roty = Math.atan2( x \* Math.cos(rotx), z )

rotz = Math.atan2( Math.cos(rotx), Math.sin(rotx) \* Math.sin(roty) )

Hopefully this is correct up to signs. I think the easiest way to fix the signs is by trial and error. Indeed, you appear to have gotten the signs on rotx and roty correct -- including a subtle issue with regards to z -- so you only need to fix the sign on rotz.

I expect this to be nontrivial (possibly depending on which octant you're in), but please try a few possibilities before saying it's wrong. Good luck!

Here is the code that finally worked for me.

I noticed a "flip" effect that occurred when the object moved from any front quadrant (positive Z) to any back quadrant. In the front quadrants the **front** of the object would always face the point. In the back quadrants the **back** of the object always faces the point.

This code corrects the flip effect so the front of the object **always** faces the point. I encountered it through trial-and-error so I don't really know what's happening!

rotx = Math.atan2( y, z );

if (z >= 0) {

roty = -Math.atan2( x \* Math.cos(rotx), z );

}else{

roty = Math.atan2( x \* Math.cos(rotx), -z );

}