Perspective projection is a technique used in computer graphics, modeling, and visual arts to represent three-dimensional objects on a two-dimensional plane, simulating the way human vision perceives the world. The concept essentially reduces the 3D world to a 2D point of view, displaying how objects appear smaller as they get further from the observer.

In mathematical terms, perspective projection is represented by a transformation that maps points in 3D space (x, y, z) onto a 2D plane. The simplest form of perspective projection assumes that the observer is looking at the object from a fixed point (the eye), and the projection is made onto a plane (often the image plane). The relation between a point (x,y,z)(x, y, z)(x,y,z) in 3D and its corresponding projection (x′,y′)(x', y')(x′,y′) on the 2D plane is given by the equations:

x′=xzx' = \frac{x}{z}x′=zx​ y′=yzy' = \frac{y}{z}y′=zy​

These equations imply that as zzz (the depth of the point) increases, the projected point on the 2D plane moves closer to the origin, making the object appear smaller.

In the diagram below, a 3D point is shown in front of an image plane. The point is projected onto the plane using perspective projection, with the distance zzz affecting the size of the image.

**Example:**

Consider a point (2,3,4)(2, 3, 4)(2,3,4) in 3D space. The perspective projection of this point onto the 2D plane (assuming the projection center at the origin) would be:

x′=24=0.5x' = \frac{2}{4} = 0.5x′=42​=0.5 y′=34=0.75y' = \frac{3}{4} = 0.75y′=43​=0.75

Thus, the projected point on the 2D plane would be (0.5,0.75)(0.5, 0.75)(0.5,0.75).

**References:**

* Hearn, D., & Baker, M. P. (1997). *Computer Graphics: C Version*. Prentice Hall. pp. 60-65.
* Foley, J. D., van Dam, A., Feiner, S. K., & Hughes, J. F. (1995). *Computer Graphics: Principles and Practice*. Addison-Wesley. pp. 92-99.