7 Questions

ABSTRACT: The purpose of this paper is to pose questions concerning matrices, coordinate systems, and a particular sinusoidal function, to be addressed by the scientific community.

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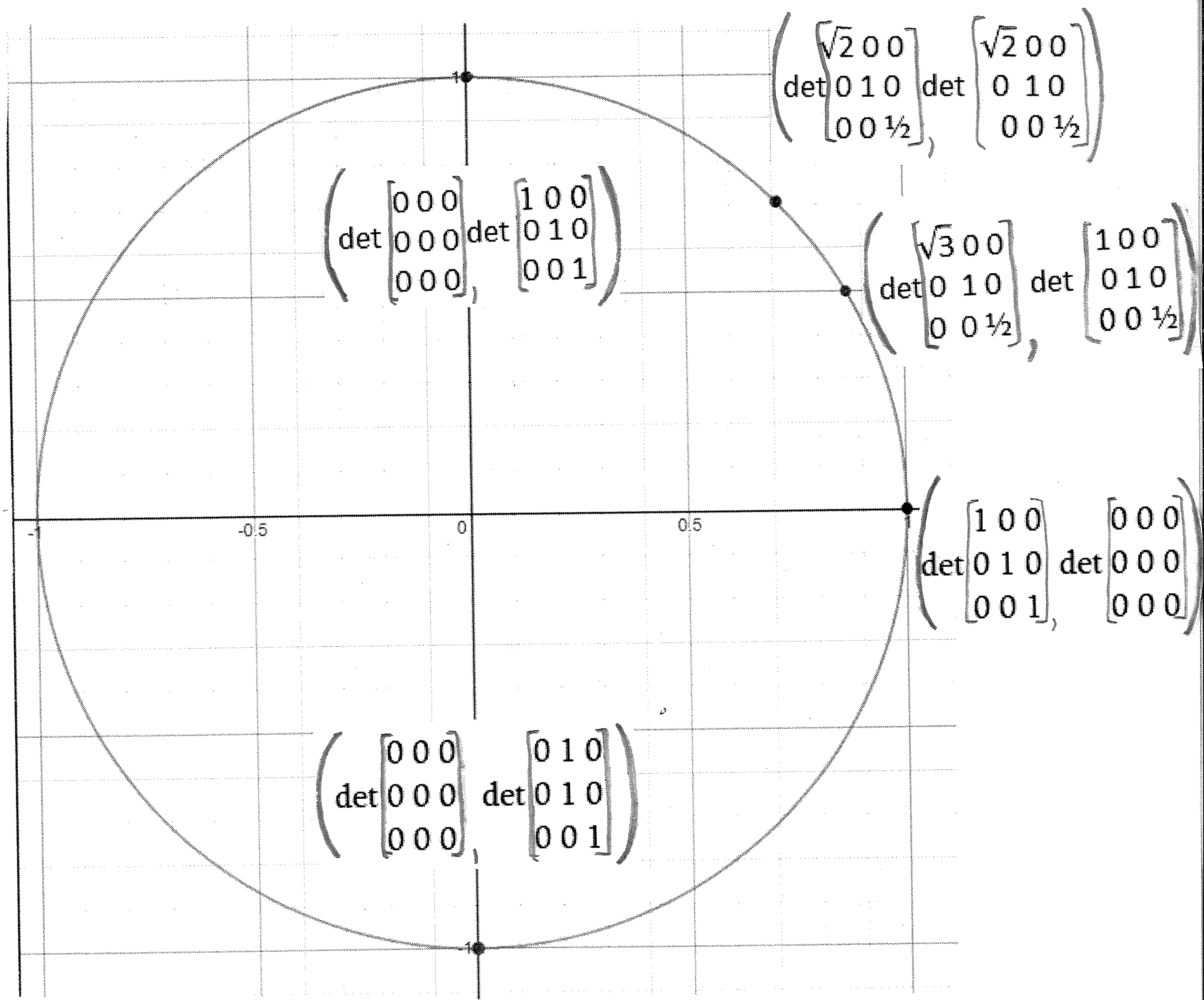
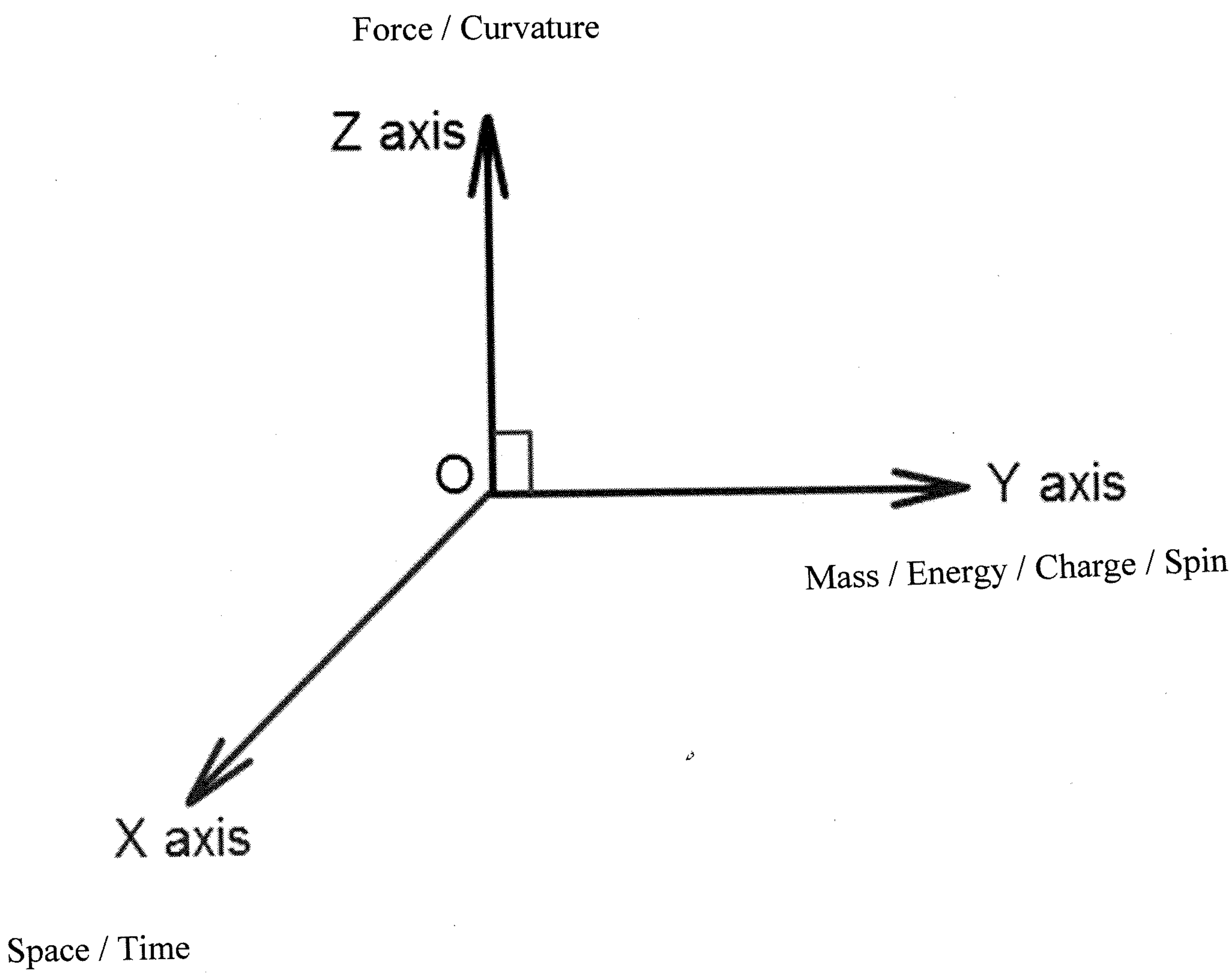
I. *Is it possible to use the scalar determinates of matrices to provide inputs for coordinates on a Cartesian coordinate plane, and could scalar dot products of tensors be graphed in this way, as well?*



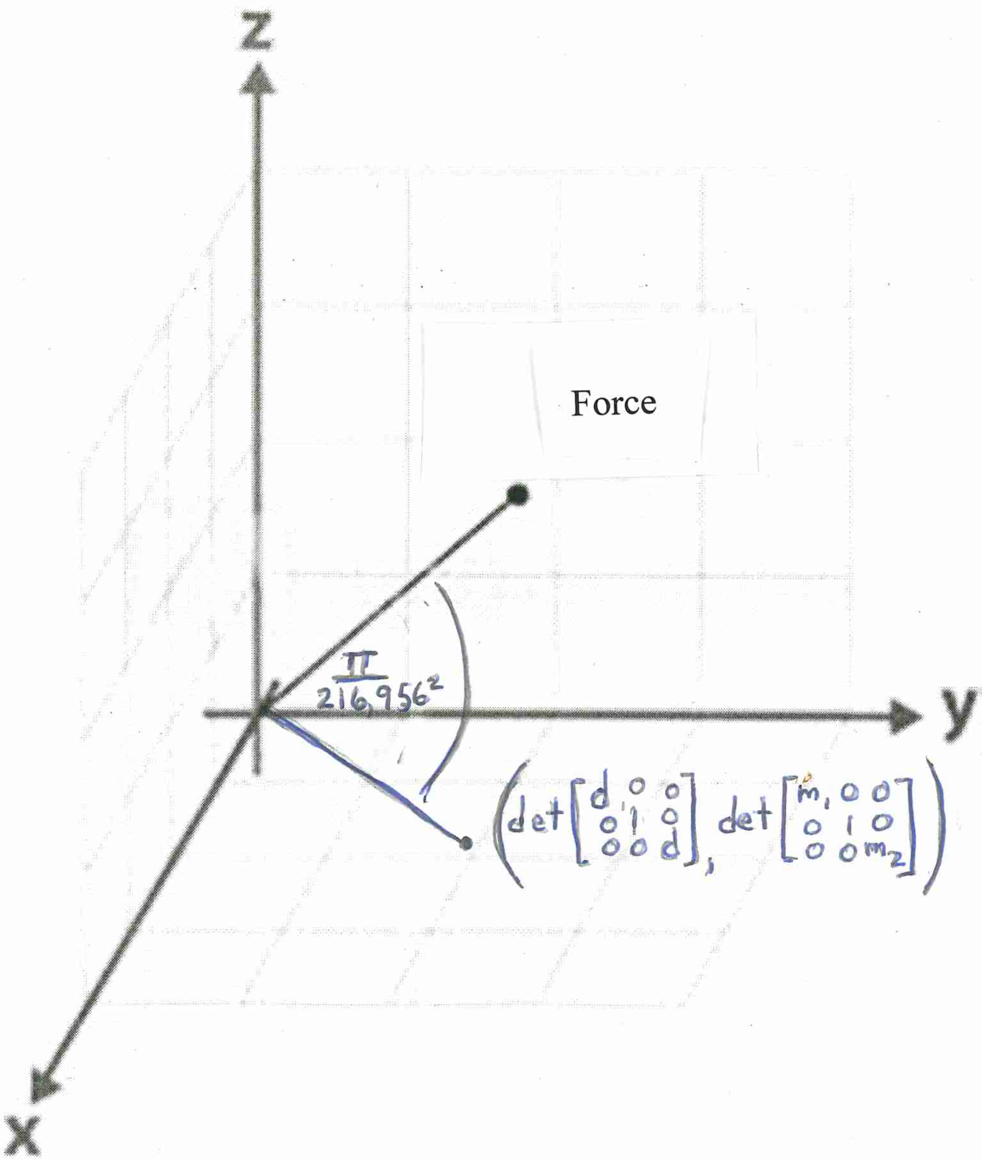
(Above is an image of the unit circle with points displayed as determinates of matrices, in the way I mean. Here I have used 3x3 diagonal matrices each with unity at the center, though the idea I am asking about extends to other matrices too.)

II. *Could a coordinate system be constructed in which dimensional quantities like length, width, height, and time are designated by a matrix on the x-axis, while material qualities like mass, energy, charge, and spin are designated by a matrix on the y-axis, and the dependent variables of force and curvature are likewise graphed on the z-axis?*



(Above is an image of the method I am asking about, in which spatial/temporal inputs are graphed on the x-axis, material qualities are on the y-axis, and force, the dependent variable, is graphed on the z-axis.)

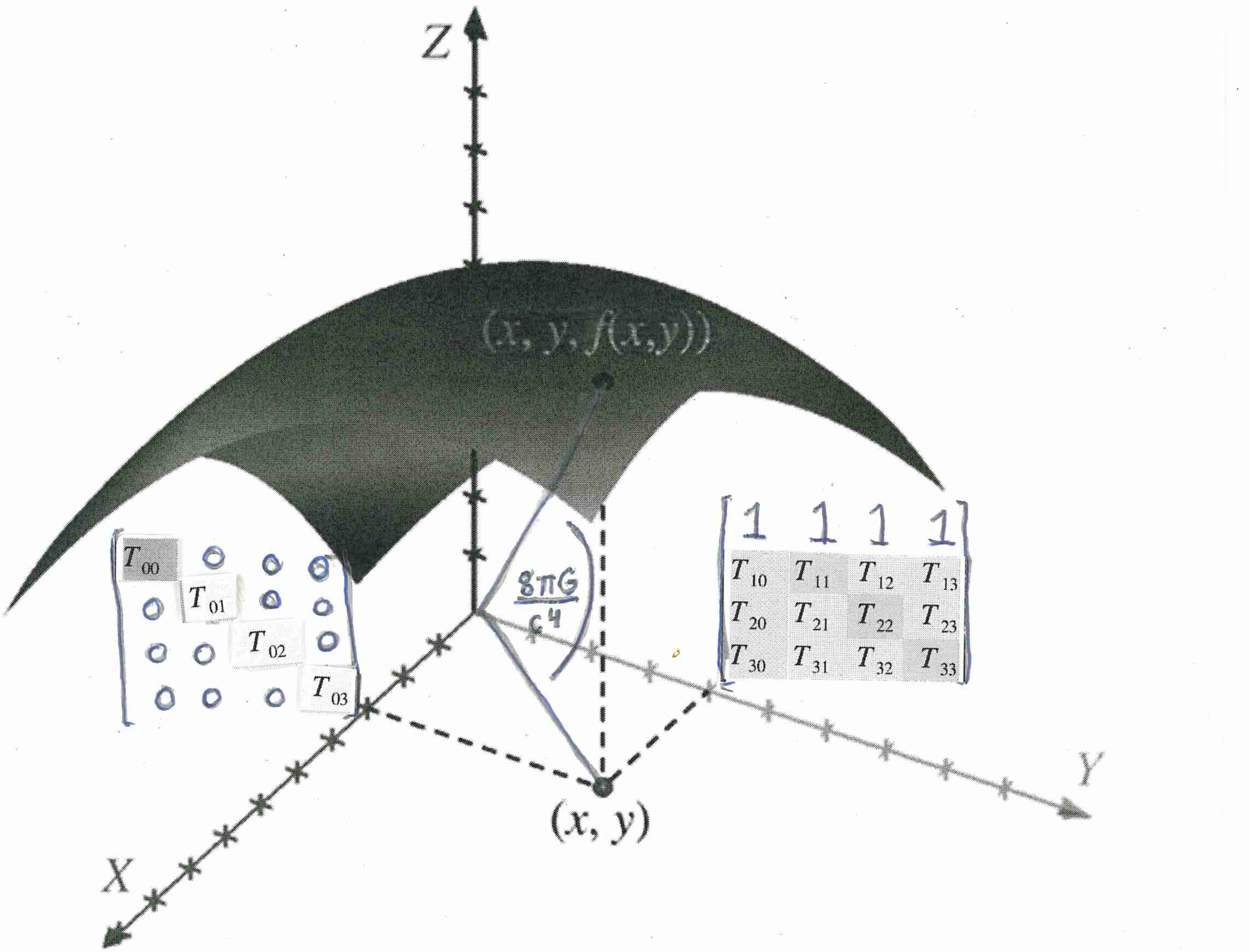
III. *Could Newton's equation for gravity (or Coulomb's equation for electric attraction and repulsion) be graphed in such a coordinate plane, so that the slope of a line through a certain point, multiplied by a constant angle on the z-axis yields a dependent variable which equates to force?*



$$F = G\frac{m_1 m_2}{d^2}$$

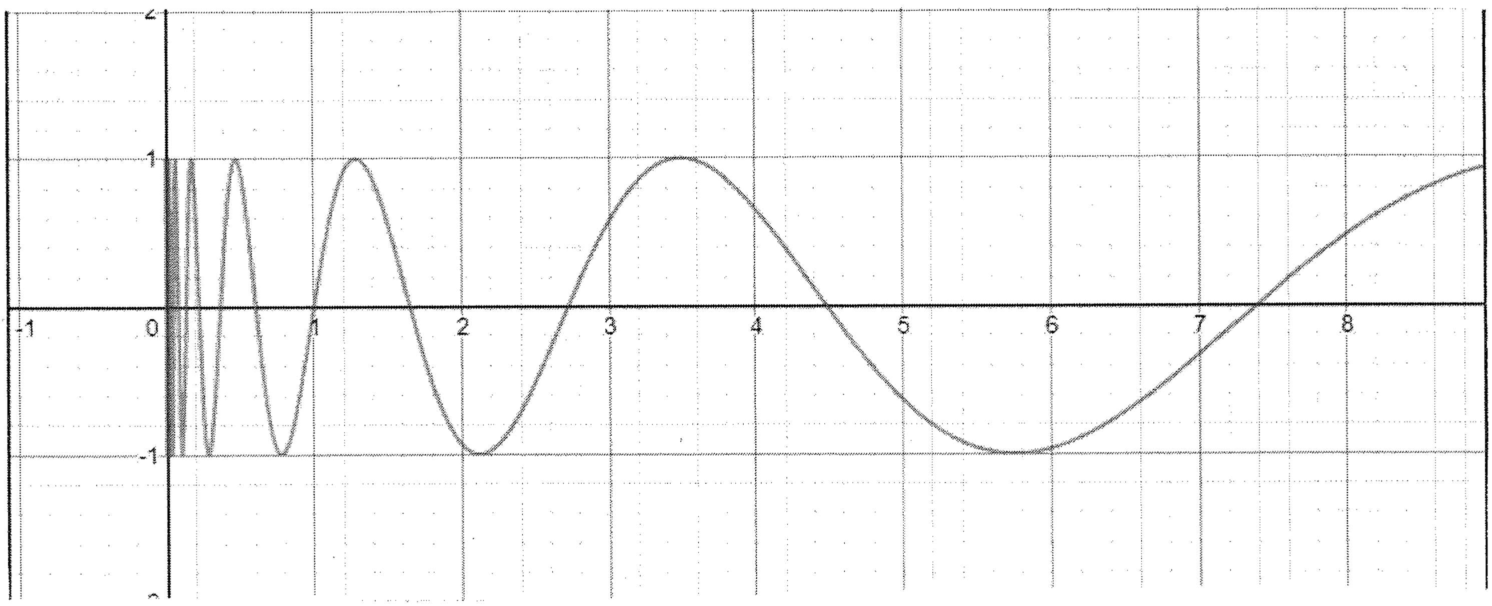
(Above is Newton's equation graphed in the manner I am asking about, in which the slope of the line through a point is multiplied by the Gravitational Constant [approximated here as the angle $\pi/(216{,}956)^2$] to designate a point on the z-axis representing force.)

IV. *Could the Stress-Energy Tensor* $T_{\mu\nu}$ *be divided into two tensors—one to define the spatial/temporal components and one to define the momentum flux components such that if plotted in the coordinate system previously described and multiplied by an angle equivalent to* $8\pi G/c^4$ *, a curvature could be plotted as the dependent variable on the z-axis?*



(Above is a general approximation of the reconstruction of the Stress-Energy Tensor in two parts I am asking about, multiplied by a constant angle $8\pi G/c^4$ to yield a point on a curve.)

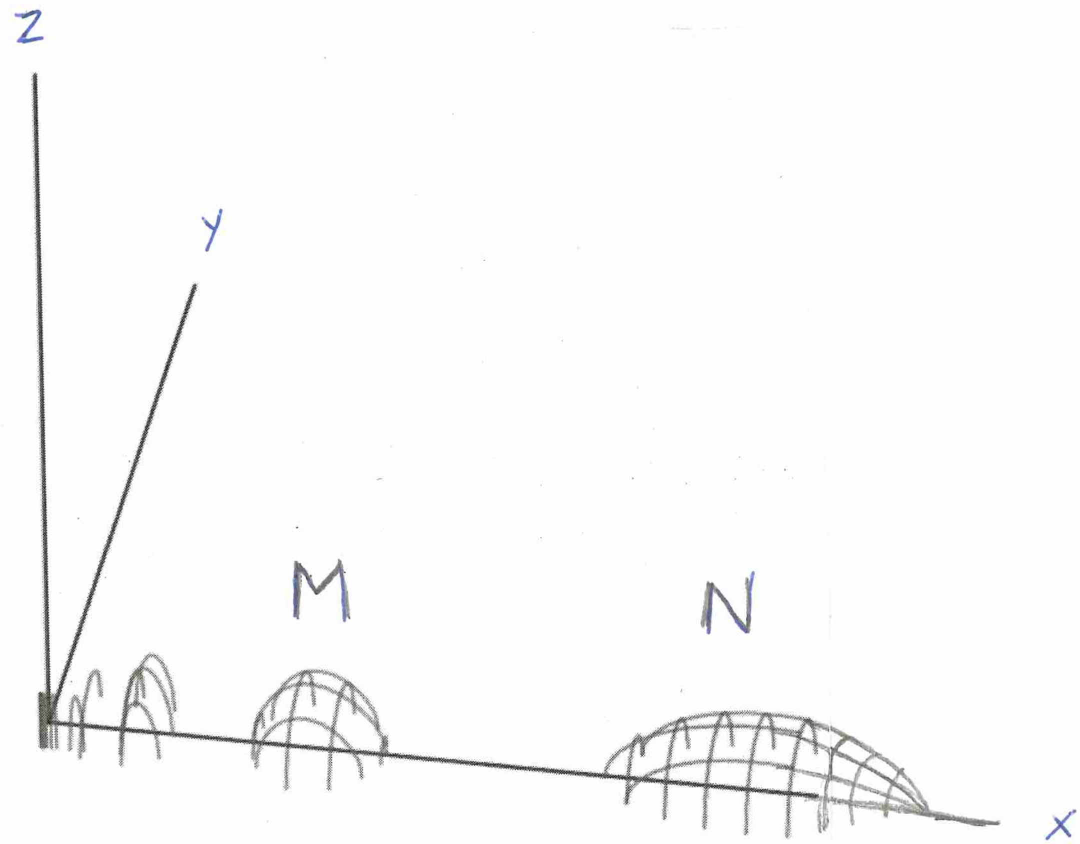
V. *Does the function f(x) = sin(2π(ln(x))) accurately describe the electromagnetic spectrum?*



$$y = \sin\left(2\pi\left(\ln(x)\right)\right)$$

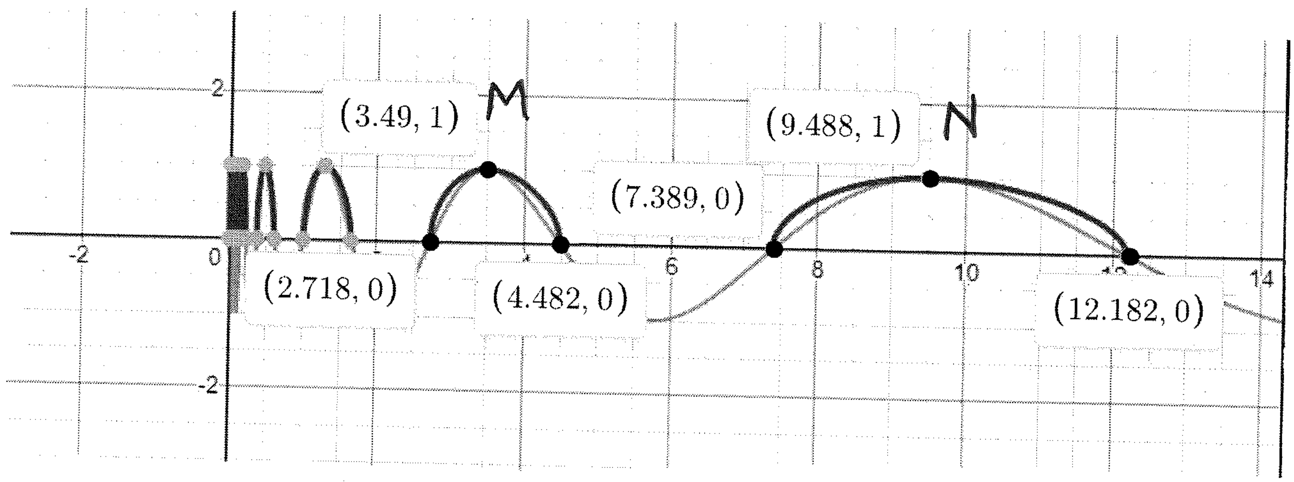
(Above is a graph of the function f(x) = sin(2π(ln(x))). It looks similar to the approximation of the electromagnetic spectrum in introductory textbooks.)

VI. *Does the manifold created by the function* $f(x,y) = \sqrt{(\sin(2\pi(\ln(x)))-y^2}$ *when evaluated either from x=2.718 to 4.482, or from x= 7.389 to 12.182, show an approximation of the same curvature as the Ricci Tensor, if the function is extended into four dimensions such that* $f(x,y,z,t) = \sqrt{(\sin(2\pi(\ln(x)))-y^2-z^2-t^2}$ *?*



$$f(x,y) = \sqrt{\sin\left(2\pi\left(\ln(x)\right)\right) - y^2}$$

(Above is an approximation of the function $f(x,y) = \sqrt{(\sin(2\pi(\ln(x)))-y^2}$. The surfaces I am curious about are labeled M and N, respectively)

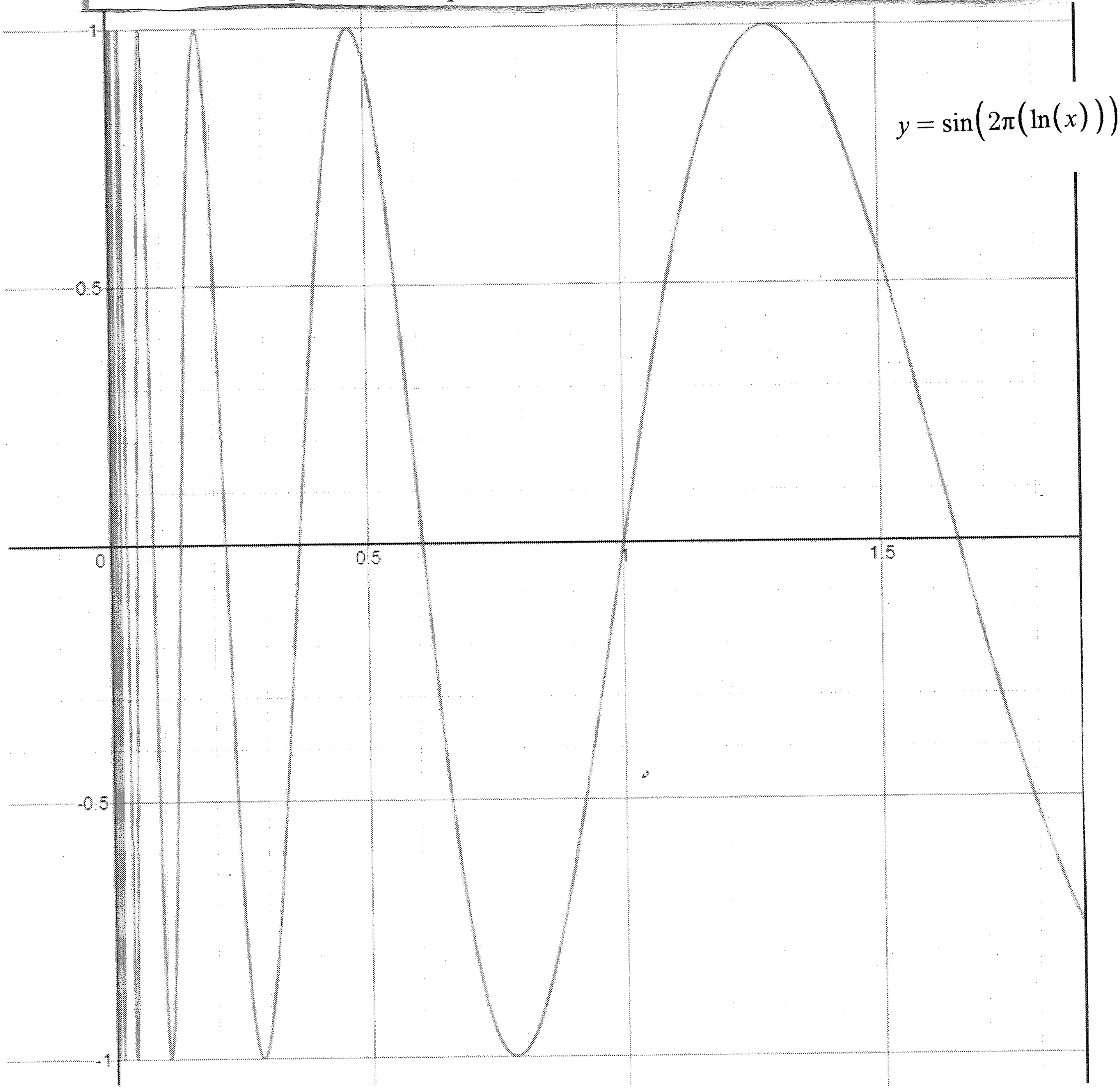


$y = \sqrt{\sin\left(2\pi\left(\ln(x)\right)\right)}$

$y = \sin\left(2\pi\left(\ln(x)\right)\right)$

(Above is "side view" of the surfaces considered in this question, showing the geodesics of the manifolds I am curious about, labeled M and N, respectively. The related function f(x) = sin(2π(ln(x))) is also shown.)

VII. *Could the behavior of the function f(x) = sin(2π(ln(x))) close to zero be used to describe the superposition of probability density waveforms in quantum mechanics, and could this function being defined at -1 give rise to the imaginary unit in Schrödinger's Wave Equation?*



(Above is a close up view of the behavior of the function f(x) = sin(2π(ln(x))) as it approaches zero from the right.)