Coordinate Axes Model:

Visualization and Reconsideration of Modern Intellectual History Methodologies through Python Matplotlib and Michel Foucault

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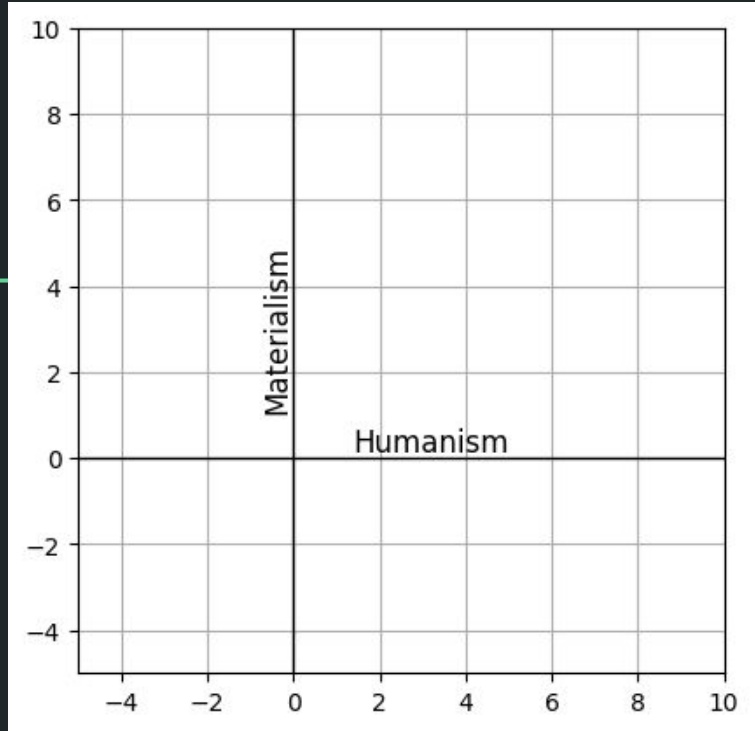


Background: Symbolic logic

The following are the primitive propositions employed in the calculus of propositions. The letters "Pp" stand for "primitive proposition."

(1) Anything implied by a true premiss is true Pp.

This is the rule which justifies inference.

(2) $\vdash : p \vee p . \supset . p$ Pp,

i.e. if p or p is true, then p is true.

(3) $\vdash : q . \supset . p \vee q$ Pp,

i.e. if q is true, then p or q is true.

(4) $\vdash : p \vee q . \supset . q \vee p$ Pp,

i.e. if p or q is true, then q or p is true.

(5) $\vdash : p \vee (q \vee r) . \supset . q \vee (p \vee r)$ Pp,

i.e. if either p is true or "q or r" is true, then either q is true or "p or r" is true.

(6) $\vdash :. q \supset r . \supset : p \vee q . \supset . p \vee r$ Pp,

i.e. if q implies r, then "p or q" implies "p or r."

Symbol	Definition
A	Assertion
~A	Negation
A∧ B	Conjunction
A ∨ B	Disjunction
A⇒ B	Implication
A⇐ B	Reduction
A⇔ B	equivalence

Whitehead, A. N. & Russell, B. (1910) *Principia Mathematica*. Cambridge: University Press.

The Foucauldian Syntax

Archaeology ↔ Temporal

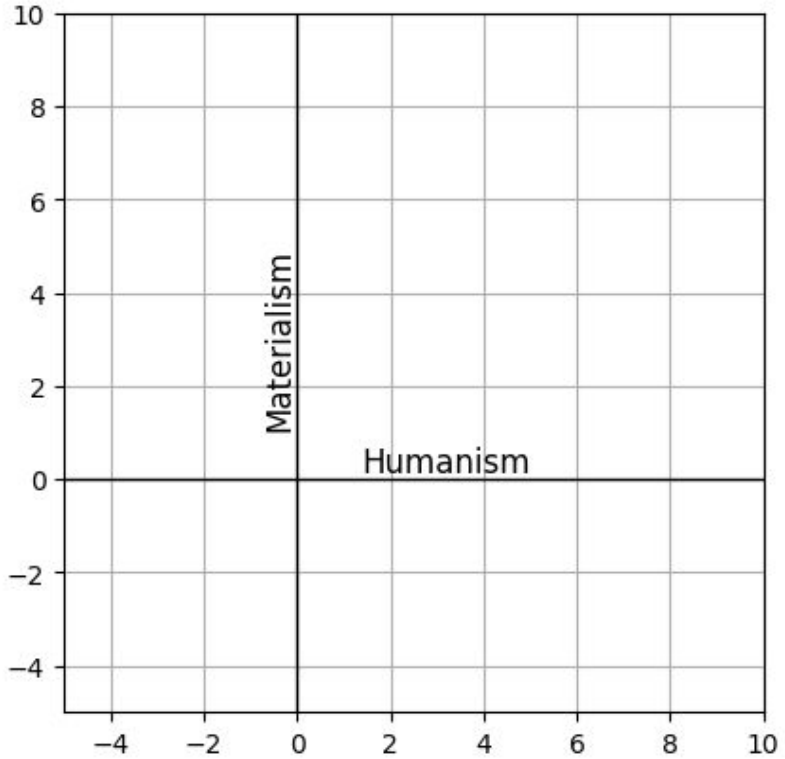
Uncovers the chemistry between different components of knowledge.

Episteme ↔ Spacial

An era's environment for knowledge production. The physics of knowledge.

Foucault, M. (2002 [1966]). *The Order of Things: An Archaeology of the Human Sciences*. New York: Routledge.
——— (1991 [1971]). *The Archaeology of Knowledge and the Discourse of Language*. New York: Pantheon Books.

Geometric Philosophy: Coordinate Axes Model



A coordinate plane with archaeology (time) as the limit (Z-value)

e.g.: `y = 2x + 4, {5 < x < 8}`

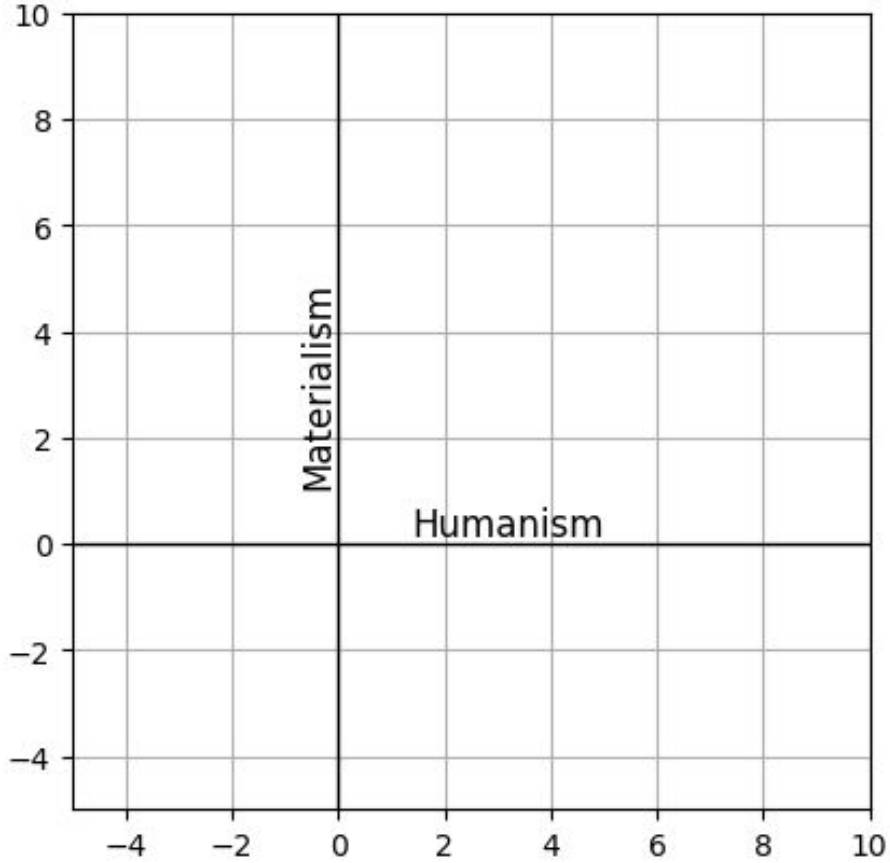
With the X and Y axes representing the components of episteme.

e.g.: `(3, 6), z = 2 :` The episteme at 2 units of time consists of 3 units of Knowledge Component X and 6 units of Knowledge Component Y.

Labeling the Axes: Humanism-Materialism

X Axis: **Humanism**
The combination of sociology, cultural studies, and cultural anthropology. The discourse over how humans interact.

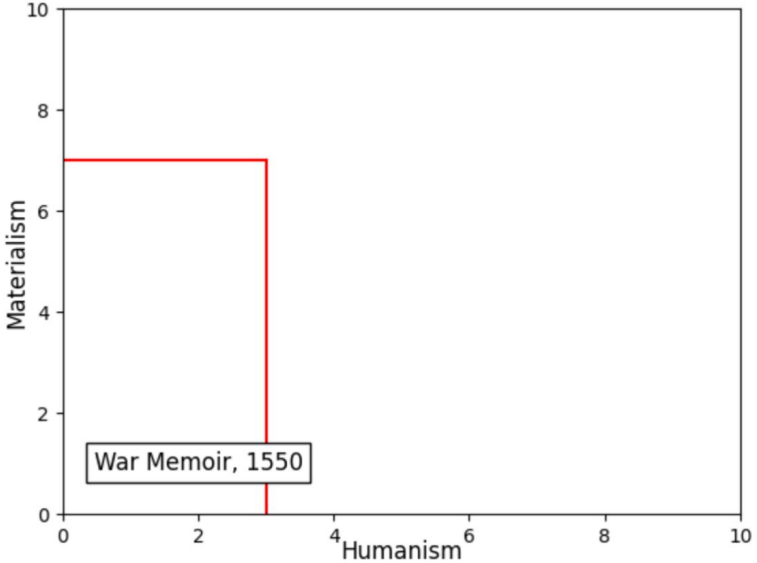
Y Axis: **Materialism**
New Materialism - the autonomy of materials from human influences.



Case Study - Statistics v. Memoirs

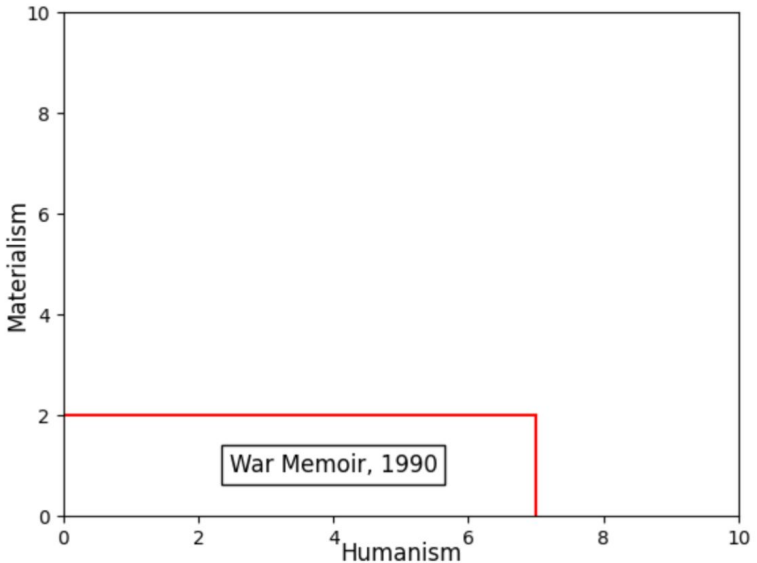
Renaissance war memoirs/narratives:
A time of sufficient individualism to write memoirs independent of official accounts but not enough to build a full individualistic reflection.

Knowledge = data x objective observation



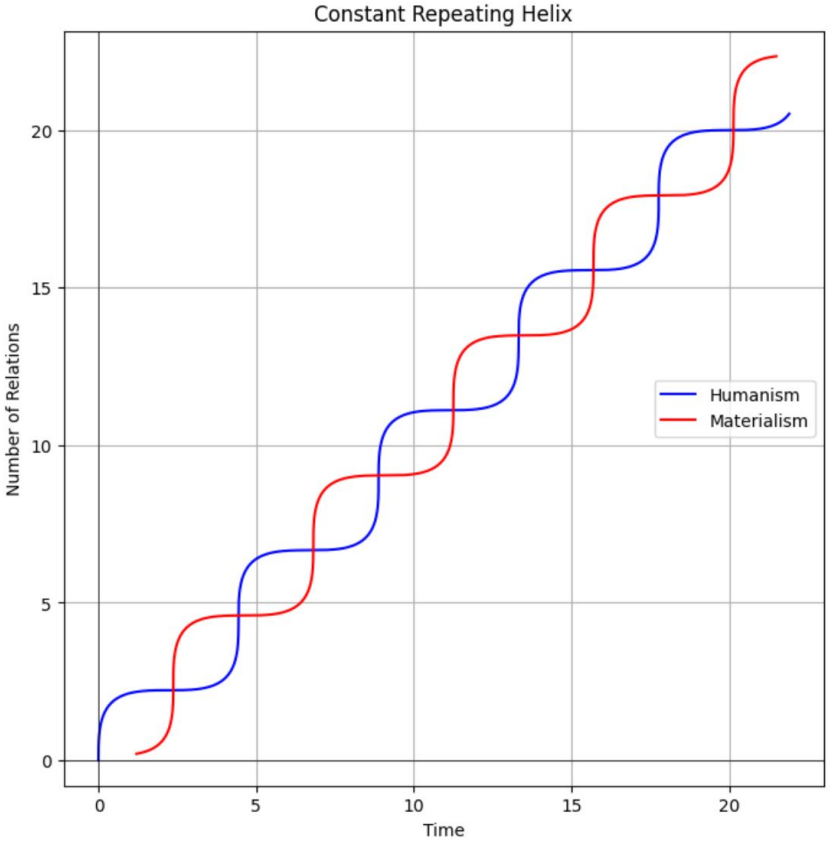
Modern war memoirs/narratives:
Journeys of authors' personal experiences with little regards to authoritative figures such as generals, "heroes," or leaders.

Knowledge = experience x sensibility



Harari, Y. N. (2009). Scholars, Eyewitnesses, and Flesh-Witnesses of War: A Tense Relationship. *Partial Answers: Journal of Literature and the History of Ideas*, 7(2), 213-228.
——— (2008). *The Ultimate Experience: Battlefield Revelations and the Making of Modern War Culture, 1450– 2000*. Houndmills: Palgrave Macmillan.

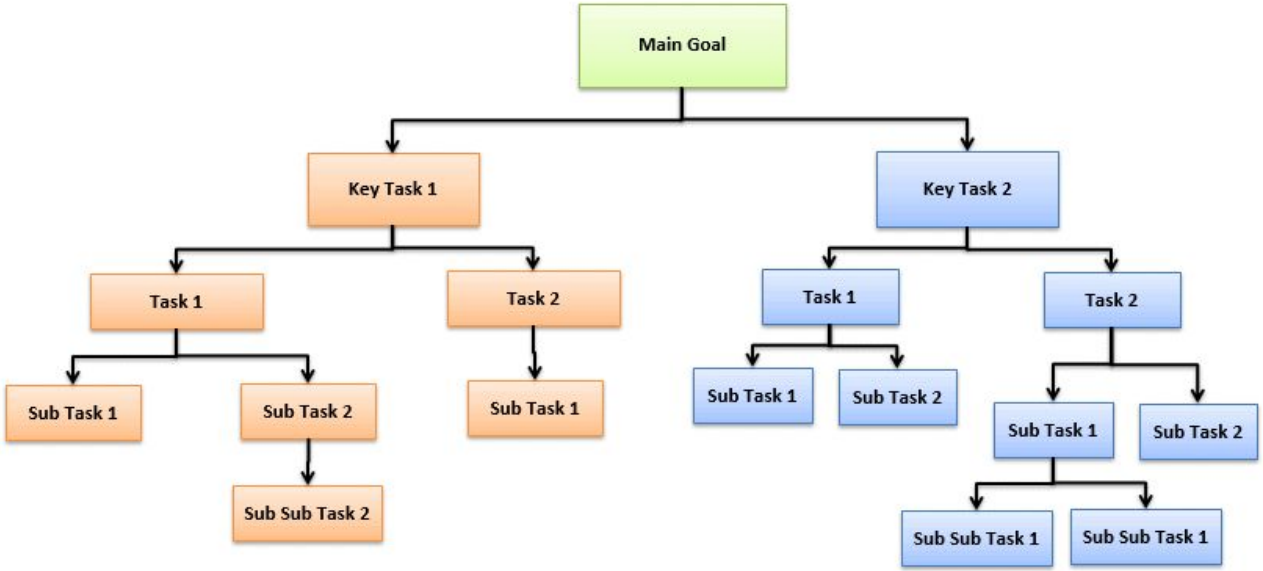
Coordinate Axes Model - Type 1
Constant Repeating Helix



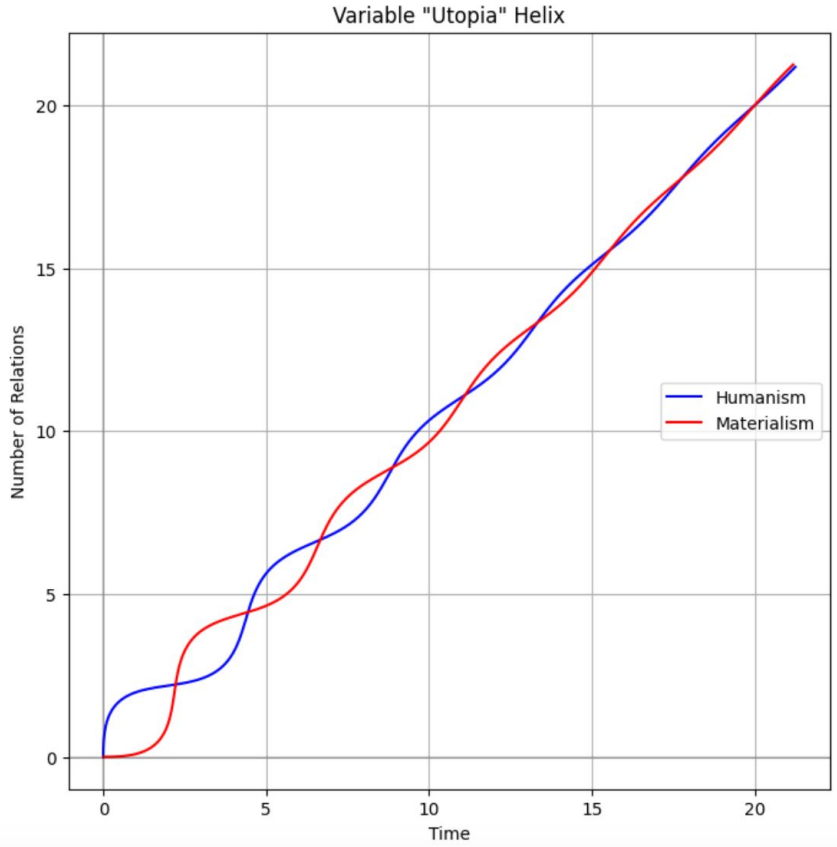

```python
import numpy as np
import matplotlib.pyplot as plt

def g(x, phase=0):
    return np.sin(x + phase)
theta = np.pi / 4  #rotation angle
def rotate_x(x, y):
    return x * np.cos(theta) - y * np.sin(theta)
def rotate_y(x, y):
    return x * np.sin(theta) + y * np.cos(theta)
x_values = np.linspace(0, 30, 400)
y_values = g(x_values)
y_values_shifted = g(x_values, phase=np.pi/4)
x_rotated = rotate_x(x_values, y_values)
y_rotated = rotate_y(x_values, y_values)
horizShiftValue = 1
x_rotated_shifted = rotate_x(x_values + horizShiftValue, -y_values_shifted)
y_rotated_shifted = rotate_y(x_values + horizShiftValue, -y_values_shifted)

plt.figure(figsize=(10, 6))
plt.plot(x_rotated, y_rotated, label='Original Function Rotated', color='blue')
plt.plot(x_rotated_shifted, y_rotated_shifted, label='Shifted Function Rotated', color='red')
plt.title('Double Helix Illusion in 2D')
plt.xlabel('x')
plt.ylabel('y')
plt.axhline(0, color='black',linewidth=0.5)
plt.axvline(0, color='black',linewidth=0.5)
plt.grid(True)
plt.legend()
plt.axis('equal')
plt.show()
```

Constant Repeating Helix

- Knowledge tree view (that knowledge branches out from one source)
- Evolutionary perspective



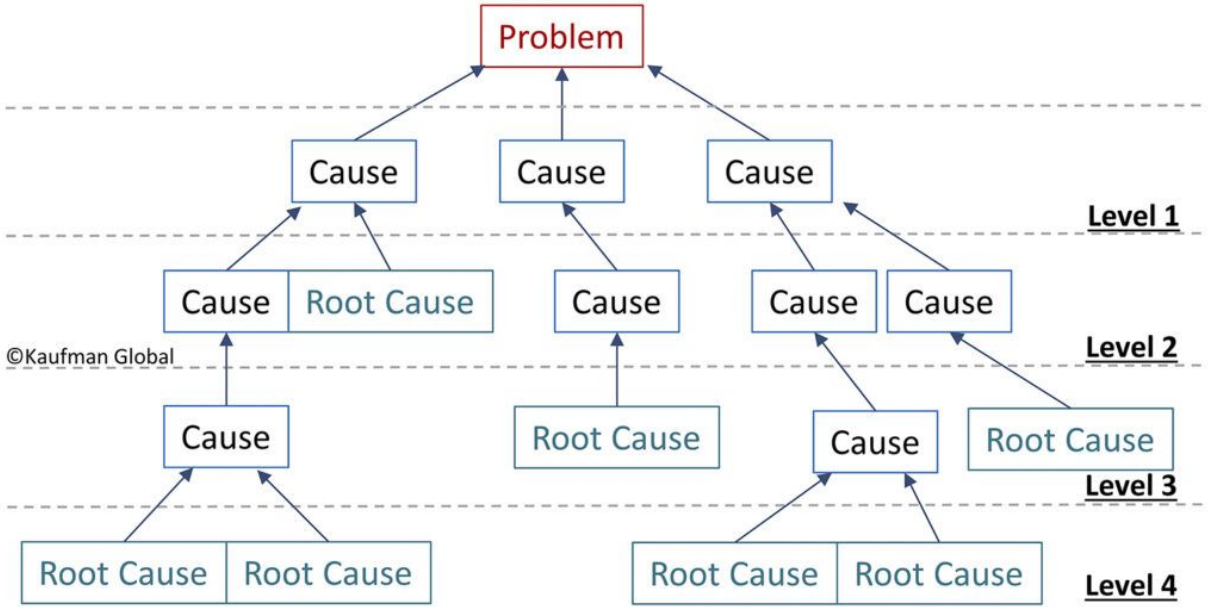
Coordinate Axes Model - Type 2
Variable “Utopia” Helix




```python
import numpy as np
import matplotlib.pyplot as plt

def g(x):
    return np.sin(x) * np.exp(-0.1 * x)
theta = np.pi / 4  # 45 degrees

def rotate_x(x, y):
    return x * np.cos(theta) - y * np.sin(theta)
def rotate_y(x, y):
    return x * np.sin(theta) + y * np.cos(theta)
x_values = np.linspace(0, 30, 500)
y_g = g(x_values)
x_rotated_g = rotate_x(x_values, y_g)
y_rotated_g = rotate_y(x_values, y_g)

x_rotated_g_reflected = rotate_x(x_values, -y_g)
y_rotated_g_reflected = rotate_y(x_values, -y_g)

plt.figure(figsize=(8, 8))
plt.plot(x_rotated_g, y_rotated_g, label='Humanism', color='blue')
plt.plot(x_rotated_g_reflected, y_rotated_g_reflected, label='Materialism', color='red')
plt.title('Variable \"Utopia\" Helix')
plt.xlabel('Time')
plt.ylabel('Number of Relations')
plt.axhline(0, color='black', linewidth=0.25)
plt.axvline(0, color='black', linewidth=0.25)
plt.grid(True)
plt.axis('equal')
plt.legend()
plt.show()
```

Variable “Utopia” Helix

- Core-idea tree view (that knowledge leads back to its original source)
- New-materialistic view of humanism and materialism knowledge progression



Future plans:

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Calculating areas under the curve using integrals. E.g.:

Performing the calculation using the SciPy library.

$$A_1 = \int_a^b f(x)\,dx$$

$$A_2 = \int_a^b g(x)\,dx$$

Theoretical:

Does the history of ideas always guarantee that the Y values of the helices increase as X values increase?

Mathematical:

How, or is it reasonable, to apply differential geometry to derive equations for the helices, and do the derived equations have to be trigonometric equations?

How should we reference the origin point and the original X and Y axes when calculating integrals of the curves?