Basic Time DAE Formulae

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(just a few)

Time-based Task Complexity

TC = R x D x C

TC: time-based task complexity

R: task requirements (e.g., skills, knowledge, experience)

D: task difficulty (e.g., level of challenge, cognitive load)

C: task complexity (e.g., degree of interdependence, scope)

Let's say we have a project to develop a new software application. Using the time-based task complexity formula, we can calculate the task complexity as follows:

R = 8 (out of 10) - This project requires a high level of technical skills, knowledge, and experience in software development.

D = 6 (out of 10) - The project has moderate difficulty, with several complex features that need to be developed and tested.

C = 7 (out of 10) - The project has a moderate degree of interdependence between different features, and a medium-sized scope.

TC = R x D x C

TC = 8 x 6 x 7

TC = 336

Therefore, the time-based task complexity of this project is 336. This formula can be used to estimate the amount of time and resources required to complete the project, and to identify areas where additional support or resources may be needed to ensure successful completion.

Time-based Task Productivity

TP = (Q x E) / T

TP: time-based task productivity

Q: task quality (e.g., accuracy, reliability, usefulness)

E: task efficiency (e.g., speed, resource utilization)

T: task duration (e.g., time spent on task)

Economic Efficiency

TEE_t = (TP_t + DP_t + CP_t) / TLT_t

Where:

TEE_t = time-based economy efficiency at time t

TP_t = total production time at time t

DP_t = total distribution time at time t

CP_t = total consumption time at time t

TLT_t = total latency time at time t (sum of all time delays in the economic system)

Suppose we want to calculate the time-based economy efficiency of a certain country at a specific time (t). We can collect data on the total production time (TP_t), total distribution time (DP_t), and total consumption time (CP_t) of all economic activities within that country at time t. We can also calculate the total latency time (TLT_t) at time t, which is the sum of all time delays in the economic system.

For example, let's say we collect the following data for a country at time t:

TP_t = 1000 hours

DP_t = 500 hours

CP_t = 700 hours

TLT_t = 300 hours

We can plug these values into the time-based economy efficiency formula:

TEE_t = (TP_t + DP_t + CP_t) / TLT_t

TEE_t = (1000 + 500 + 700) / 300

TEE_t = 3.33

Therefore, the time-based economy efficiency of the country at time t is 3.33. This indicates that, on average, the country is able to produce, distribute, and consume goods and services efficiently relative to the time delays in the economic system.

Time-based Currency Supply

Time-based currency supply formula: TCS_t = TCS_t-1 + TPR_t - TBR_t

Where:

TCS_t = time-based currency supply at time t

TPR_t = time-based currency production rate at time t (based on the completion of time-wrapped tasks and actions)

TBR_t = time-based currency burn rate at time t (based on the usage or spending of time-based currency)

This formula calculates the change in the time-based currency supply over time, taking into account the production and burning of currency.

Time-based Task

TV = P x (Q + E) / T

TV: time-based task value

P: task performance (e.g., meeting or exceeding expectations)

Q: task quality (e.g., as above)

E: task efficiency (e.g., as above)

T: task duration (e.g., as above)

Time-based Task Meritocracy

TM = (W x TV) / S

TM: time-based task meritocracy

W: individual's weighting factor (e.g., based on experience, seniority, expertise)

TV: task value (e.g., as above)

S: overall task supply (e.g., total number of tasks available)

Automation Distribution Index

Automation Distribution Index (ADI) = ∑ [(A / T) x (P / E) x (1 - I)]

Where:

∑ = the sum of all economic sectors and activities within the meritocratic time-based economy

A = the level of automation in a specific economic sector or activity

T = the total technological resources available in that sector or activity

P = the level of productivity in that sector or activity

E = the level of employment in that sector or activity

I = the inefficiency factor that accounts for any negative impacts of automation on productivity, employment, and income distribution

This formula calculates the Automation Distribution Index, which measures the distribution of automation across different economic sectors and activities within the meritocratic time-based economy. It takes into account the level of automation in a specific sector or activity, as well as the total technological resources available, the level of productivity, and the level of employment. The formula also factors in any negative impacts of automation on productivity, employment, and income distribution, represented by the inefficiency factor. The ADI can be used to assess the effectiveness of automation policies and strategies aimed at promoting productivity, employment, and income distribution in a fair and equitable manner within the meritocratic time-based economy.

Automation Index for Economic Sector

Automation Index for an Economic Sector = (Total Value-Added from Automation / Total Value-Added from Labor) x (1 - Automation Inefficiency Factor)

Where:

Total Value-Added from Automation = the total value added to the economic sector or activity through the use of automation technologies and processes

Total Value-Added from Labor = the total value added to the economic sector or activity through labor and human resources

Automation Inefficiency Factor = a factor that accounts for any inefficiencies in the automation process, including technological limitations, maintenance costs, and other external factors

This formula calculates the Automation Index for a specific economic sector or activity, which measures the level of automation within it. It takes into account the value added through automation technologies and processes, as well as the value added through labor and human resources. The formula also factors in any inefficiencies in the automation process, including technological limitations, maintenance costs, and other external factors that may impact the overall efficiency of the automation. The Automation Index can be used to assess the effectiveness of automation strategies and policies in a given economic sector or activity, as well as to compare the level of automation between different sectors or activities.

Let's apply this formula to the manufacturing industry in the United States.

Total Value-Added from Automation = $100 billion

Total Value-Added from Labor = $200 billion

Automation Inefficiency Factor = 0.1

Automation Index for the Manufacturing Industry = (100 / 200) x (1 - 0.1) = 0.45

The Automation Index for the Manufacturing Industry in the US is 0.45, which indicates that the industry has a moderate level of automation. This means that while automation technologies and processes are used in the manufacturing industry, there is still significant value added through labor and human resources. The inefficiency factor of 0.1 accounts for any limitations and costs associated with automation in the manufacturing industry.

Automation Inefficiency Factor

The formula for the automation inefficiency factor can be represented as follows:

Automation Inefficiency Factor = (Total Cost of Automation - Total Value-Added from Automation) / Total Value-Added from Automation

Where:

Total Cost of Automation = the total cost of implementing and maintaining automation technologies and processes in the economic sector or activity

Total Value-Added from Automation = the total value added to the economic sector or activity through the use of automation technologies and processes

This formula calculates the automation inefficiency factor, which measures the inefficiencies in the automation process. It takes into account the total cost of implementing and maintaining automation technologies and processes, as well as the total value added to the economic sector or activity through automation. The automation inefficiency factor can be used to identify areas where the implementation of automation technologies and processes can be improved, and to assess the overall efficiency of the automation process in a given economic sector or activity.

Automation Equity Ratio

The Automation Equity Ratio can be calculated as:

(Automation Ownership Equity x Automation Control Equity) / (Automation Impact on Income Inequality x Automation Impact on Wealth Inequality)

Where:

Automation Ownership Equity: measures the degree of equity in the distribution of ownership of automation technologies across different economic actors within the meritocratic time-based economy.

Automation Control Equity: measures the degree of equity in the distribution of control over the use of automation technologies across different economic actors within the meritocratic time-based economy.

Automation Impact on Income Inequality: measures the impact of automation on income inequality, taking into account factors such as changes in wages and employment opportunities.

Automation Impact on Wealth Inequality: measures the impact of automation on wealth inequality, taking into account factors such as changes in asset ownership and distribution.

This formula provides a comprehensive assessment of the degree of equity in the distribution of automation within the meritocratic time-based economy, taking into account both ownership and control of automation technologies, as well as their impact on income and wealth inequality. The Automation Equity Ratio can be used to evaluate the effectiveness of policies and strategies aimed at promoting equity in the adoption and use of automation technologies.

Let's say we want to calculate the Automation Equity Ratio for the manufacturing sector in the United States. We have the following representative values:

Automation Ownership Equity: 0.75

Automation Control Equity: 0.60

Automation Impact on Income Inequality: 0.20

Automation Impact on Wealth Inequality: 0.35

Using the formula, we can calculate the Automation Equity Ratio as follows:

(0.75 x 0.60) / (0.20 x 0.35) = 6.43

This result suggests that there is a relatively high degree of equity in the distribution of automation within the manufacturing sector in the United States, with a ratio of over 6 indicating a relatively equitable distribution. However, it's important to note that this is just one example, and that the values used for the variables may vary depending on the specific context and industry being evaluated.

Human-to-AI Labor Ratio

Human-to-AI Labor Ratio = (Total Number of Human Workers / Total Number of AI Workers) x (Total Value-Added from Human Labor / Total Value-Added from AI Labor) x (AI Efficiency Factor)

Where:

Total Number of Human Workers = the total number of human workers engaged in the economic activity

Total Number of AI Workers = the total number of AI workers engaged in the economic activity

Total Value-Added from Human Labor = the total value added to the economic activity through human labor and resources

Total Value-Added from AI Labor = the total value added to the economic activity through AI labor and resources

AI Efficiency Factor = a factor that accounts for the relative efficiency and productivity of AI labor compared to human labor

This formula calculates the Human-to-AI Labor Ratio for a given economic activity, taking into account the number of human and AI workers involved, as well as the relative value-added from their labor. The formula also factors in the AI efficiency factor, which accounts for the productivity and efficiency of AI labor compared to human labor. The Human-to-AI Labor Ratio can be used to assess the extent to which AI labor is replacing or complementing human labor in a given economic activity, as well as to monitor the balance between human and AI workers in the meritocratic time-based economy.

For example, let's consider a manufacturing industry that employs 500 human workers and 100 AI workers. The total value-added from human labor is $5 million and the total value-added from AI labor is $2 million. The AI efficiency factor is 1.5.

Human-to-AI Labor Ratio = (500 / 100) x ($5 million / $2 million) x (1.5)

Human-to-AI Labor Ratio = 25 x 2.5 x 1.5

Human-to-AI Labor Ratio = 93.75

This means that for every AI worker employed in the manufacturing industry, there are approximately 94 human workers employed. It also suggests that AI labor is adding significant value to the industry, as the value-added from AI labor is only 40% less than the value-added from human labor. However, the industry still heavily relies on human labor, with AI workers comprising only a small portion of the total workforce.

Relative Value of Artificial Resources

Relative Value of Artificial Resources = (Total Value of Artificial Resources / Total Value of Human Resources) x (1 + Perception Factor)

Where:

Total Value of Artificial Resources = the total value added to the economy through the use of artificial resources

Total Value of Human Resources = the total value added to the economy through the use of human resources

Perception Factor = a factor that accounts for any perceived bias towards artificial resources compared to human resources based on market forces

Relative Value of Human Resources

Relative Value of Human Resources = (Total Value of Human Resources / Total Value of Artificial Resources) x (1 - Perception Factor)

Where:

Total Value of Human Resources = the total value added to the economy through the use of human resources

Total Value of Artificial Resources = the total value added to the economy through the use of artificial resources

Perception Factor = a factor that accounts for any perceived bias against human resources compared to artificial resources based on market forces

Optimal Mix of Human & Artificial Resources

Optimal Mix of Human and Artificial Resources = (Total Value of Human Resources x Efficiency Ratio + Total Value of Artificial Resources x Productivity Ratio) / (Total Value of Human Resources + Total Value of Artificial Resources)

Where:

Total Value of Human Resources = the total value added to the economy through the use of human resources

Total Value of Artificial Resources = the total value added to the economy through the use of artificial resources

Efficiency Ratio = a factor that accounts for the efficiency of human resources compared to artificial resources

Productivity Ratio = a factor that accounts for the productivity of artificial resources compared to human resources

Economic Value of Human & Artificial Resources

Formula for calculating the Total Economic Value of Human and Artificial Resources in a Decentralized System:

TEV = (VH * RH) + (VA * RA)

Where:

TEV = Total Economic Value of Human and Artificial Resources

VH = Value of a Single Human Resource

RH = Number of Human Resources in the Economy

VA = Value of a Single Artificial Resource

RA = Number of Artificial Resources in the Economy

This formula calculates the total economic value of both human and artificial resources in a decentralized economic system, by multiplying the value of a single resource by the number of resources and then adding them together. It demonstrates that an increase in artificial resources does not necessarily displace human resources, but rather amplifies their value.

Productivity Index

Formula for calculating the Productivity Index in a Decentralized System:

PI = (TPH * VH) + (TPA * VA)

Where:

PI = Productivity Index

TPH = Total Productivity of Human Resources

VH = Value of a Single Human Resource

TPA = Total Productivity of Artificial Resources

VA = Value of a Single Artificial Resource

This formula calculates the productivity index of an economy by taking into account the total productivity of both human and artificial resources, multiplied by their respective values. It shows that an increase in artificial resources can amplify the productivity of human resources and lead to overall economic growth.

Labor Displacement Rate

Formula for calculating the Labor Displacement Rate in a Centralized System:

$$LDR = (1 - (HL / TL)) * 100\%$$

Where:

LDR = Labor Displacement Rate

HL = Human Labor in the Economy

TL = Total Labor in the Economy (Human + Artificial)

This formula calculates the labor displacement rate in a centralized system by taking the difference between human labor and total labor and expressing it as a percentage of total labor. It shows that an increase in artificial resources in a centralized system can lead to the displacement of human labor.

Labor Amplification Rate

Formula for calculating the Labor Amplification Rate in a Decentralized System:

$$LAR = (1 + (RA / RH)) * 100\%$$

Where:

LAR = Labor Amplification Rate

RA = Number of Artificial Resources in the Economy

RH = Number of Human Resources in the Economy

This formula calculates the labor amplification rate in a decentralized system by taking the ratio of artificial resources to human resources and expressing it as a percentage increase in labor. It shows that an increase in artificial resources in a decentralized system can lead to an amplification of human labor rather than its displacement.

Latency of Natural Resource Availability

Latency of Natural Resource Availability = Time Between Natural Resource Renewal / Replacement

Where:

Time Between Natural Resource Renewal / Replacement = the time it takes for a natural resource to replenish itself, if it is a renewable resource, or the time it takes for it to be replaced, if it is a non-renewable resource

Latency of Natural Resource Consumption = Time Taken for Consumption + Time Taken for Disposal or Recycling

Where:

Time Taken for Consumption = the time taken for the natural resource to be used or consumed

Time Taken for Disposal or Recycling = the time taken to dispose of the waste generated from the consumption of the resource or to recycle the resource for future use

These formulas can be used to evaluate the overall latency of natural resources and to identify areas where improvements can be made to reduce latency and increase efficiency.

Latency of Resource Extraction

Latency of Resource Extraction = Time Taken for Extraction + Time Taken for Transportation + Time Taken for Processing

Where:

Time Taken for Extraction = the time taken to extract the natural resource from its source

Time Taken for Transportation = the time taken to transport the resource from the extraction site to the processing facility or market

Time Taken for Processing = the time taken to process the resource into a usable form

Latency of Natural Resource Consumption

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These formulas can be used to evaluate the overall latency of natural resources and to identify areas where improvements can be made to reduce latency and increase efficiency.

Agricultural Latency

Latency of Agriculture = (Time for Growth + Time for Harvesting + Time for Processing) x Quantity of Crop

Where:

Time for Growth = the time it takes for the crop to grow from planting to maturity

Time for Harvesting = the time it takes to harvest the mature crop

Time for Processing = the time it takes to process the harvested crop into a usable form, such as milling grain into flour or canning vegetables

Quantity of Crop = the total amount of the crop produced in a given time period

This formula takes into account the time it takes for agriculture to produce a crop from planting to harvesting, as well as the time it takes to process the crop into a usable form. The formula can be used to evaluate the efficiency of agriculture in terms of its latency and to identify areas where improvements can be made.

Latency Value-Added

Latency Value-Added of an Economy = ∑(Value-Added from Reduction in Latency + Value-Added from New Technologies and Products)

Where:

∑ = the sum of all economic activities within the economy

Value-Added from Reduction in Latency = the additional value added to an economic activity through the reduction in latency time

Value-Added from New Technologies and Products = the additional value added to the economy through the creation and implementation of new technologies and products that reduce latency

This formula calculates the total value added to an economy through the reduction of latency in production and distribution processes, as well as the value added through the creation of new technologies and products that further reduce latency. It takes into account all economic activities within the economy and sums up the value added from both sources. This formula can be used to assess the overall efficiency of an economy in terms of reducing latency and increasing value.

For example, let's say an economy produces and distributes a product with a total value of $10,000. Through the reduction of latency time in the production process, $2,000 in additional value is added. Through the creation and implementation of a new technology that further reduces latency, an additional $1,000 in value is added. Using the formula, we can calculate the Latency Value-Added of the economy as:

Latency Value-Added of an Economy = $2,000 + $1,000 = $3,000

This means that the reduction in latency and implementation of new technologies has added $3,000 in value to the economy, making it more efficient and productive.

Latency Efficiency Index

Latency Efficiency Index = (Total Latency Value-Added / Total Latency Time) x (1 - Latency Inefficiency Factor)

Where:

Total Latency Value-Added = the total value added to the economy through the reduction of latency in production and distribution processes, as well as the creation of new technologies and products that reduce latency

Total Latency Time = the total time taken for all economic activities within the economy, including production, distribution, and consumption

Latency Inefficiency Factor = a factor that accounts for any inefficiencies in the latency reduction process, including government policies, regulations, and external factors

This formula calculates the Latency Efficiency Index, which measures the overall efficiency of an economy in terms of latency. It takes into account the value added through the reduction of latency in production and distribution processes, as well as the creation of new technologies and products that reduce latency. The formula also factors in any inefficiencies in the latency reduction process, including government policies, regulations, and external factors that may impact the overall efficiency of the economy. The Latency Efficiency Index can be used to assess the effectiveness of policies and strategies aimed at improving the efficiency of an economy in terms of latency.

As an example, let's say that the total latency value-added for an economy is $10 billion and the total latency time for all economic activities within the economy is 100 million hours. The Latency Inefficiency Factor is 0.2, which accounts for inefficiencies in the latency reduction process due to government policies, regulations, and other external factors.

Using these values, the Latency Efficiency Index can be calculated as follows:

Latency Efficiency Index = ($10 billion / 100 million hours) x (1 - 0.2)

Latency Efficiency Index = $100 per hour x 0.8

Latency Efficiency Index = $80 per hour

This means that for every hour spent on economic activities within the economy, $80 worth of value is added through the reduction of latency in production and distribution processes, as well as the creation of new technologies and products that reduce latency. The Latency Efficiency Index can be used to compare the efficiency of different economies in terms of reducing latency and increasing value.

Latency Elasticity

Latency Elasticity of an Economy = (% Change in Quantity of goods and services demanded / % Change in Latency) * (Average Latency / Average Quantity of goods and services demanded)

Where:

% Change in Quantity of goods and services demanded = (New Quantity Demanded - Old Quantity Demanded) / Old Quantity Demanded

% Change in Latency = (New Latency - Old Latency) / Old Latency

Average Latency = (Sum of Latencies for all goods and services) / (Total number of goods and services)

Average Quantity of goods and services demanded = (Sum of Quantities for all goods and services) / (Total number of goods and services)

Let's consider a hypothetical example where we want to calculate the Latency Elasticity of an economy that produces and distributes electronic products. We have the following values:

Old Quantity Demanded: 1000 units

New Quantity Demanded: 1200 units

Old Latency: 10 hours

New Latency: 8 hours

Total number of goods and services: 3

Latencies for each good or service: 2 hours, 8 hours, and 10 hours

Quantities for each good or service: 400 units, 600 units, and 200 units

First, let's calculate the % Change in Quantity of goods and services demanded:

% Change in Quantity of goods and services demanded = (1200 - 1000) / 1000 = 0.2 = 20%

Next, let's calculate the % Change in Latency:

% Change in Latency = (8 - 10) / 10 = -0.2 = -20%

Now, let's calculate the Average Latency:

Average Latency = (2 + 8 + 10) / 3 = 6.67 hours

And the Average Quantity of goods and services demanded:

Average Quantity of goods and services demanded = (400 + 600 + 200) / 3 = 400 units

Finally, we can calculate the Latency Elasticity of the economy:

Latency Elasticity of an Economy = (20% / -20%) * (6.67 hours / 400 units) = -1.67

In this example, the negative value of the Latency Elasticity indicates that an increase in demand for electronic products has led to a decrease in latency. This means that the economy is becoming more efficient in terms of latency, and for each 1% increase in demand, there is a 1.67% decrease in latency.

Total Latency Time

Total Latency Time of an Economy = (∑Latency Coefficients of all Economic Activities x Time Taken for Each Activity) + (Time Taken for Non-Tangible Goods)

Where:

∑Latency Coefficients of all Economic Activities = sum of the latency coefficients of all economic activities within the economy

Time Taken for Each Activity = the time taken to complete each economic activity, including production, distribution, and consumption

Time Taken for Non-Tangible Goods = the time taken to produce and consume non-tangible goods such as services and intellectual property

The formula takes into account the total latency time of an economy by calculating the sum of the latency coefficients of all economic activities within the economy and multiplying them by the time taken for each activity. The resulting value is then added to the time taken for non-tangible goods to determine the total latency time of the economy. This formula can be used to evaluate the efficiency of an economy in terms of its latency and to identify areas where improvements can be made.

Let's say we want to apply this formula to a specific real-world example, such as the production and consumption of automobiles in a certain country:

Assume the following values:

Latency coefficient of car production = 0.8

Latency coefficient of car distribution = 0.6

Latency coefficient of car consumption = 0.4

Time taken for car production = 2 months

Time taken for car distribution = 1 month

Time taken for car consumption = 1 week

Time taken for non-tangible goods = 2 days

Using the formula, we can calculate the total latency time of the automobile industry in this country:

Total Latency Time of Automobile Industry = (0.8 x 2 months) + (0.6 x 1 month) + (0.4 x 1 week) + 2 days

Total Latency Time of Automobile Industry = 1.6 months + 0.6 months + 0.0286 months + 0.0028 months

Total Latency Time of Automobile Industry = 2.2314 months

So the total latency time of the automobile industry in this country is approximately 2.23 months. This value can be used to evaluate the efficiency of the automobile industry in terms of its latency, and to identify areas where improvements can be made.

Latency-Oriented Economic Planning Model

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The Latency-Oriented Economic Planning Model can be expressed mathematically using the following equation:

$L = \sum (C * T * D)$

where L represents the total latency of the economic system, C represents the number of economic participants, T represents the average time required to complete a time-wrapped task or action, and D represents the average distance required to travel to complete a time-wrapped task or action.

This equation essentially calculates the total latency of the economic system by summing up the product of the number of economic participants, the average time required to complete a task, and the average distance required to travel to complete a task for each economic participant. This model is designed to optimize the economic system's efficiency by minimizing the total latency, which can be achieved by reducing the average time required to complete a task and the average distance required to travel to complete a task for each economic participant.

Latency Efficiency Market Hypothesis

The Latency Efficient Market Hypothesis states that in a decentralized autonomous economy, the optimal level of latency is achieved when the supply and demand of goods and services are in equilibrium, and the cost of fulfilling a need is minimized. This can be represented mathematically as:

$$LEMH = E(C) / E(T)$$

Where LEMH represents the Latency Efficient Market Hypothesis, E(C) represents the expected cost of fulfilling a need, and E(T) represents the expected time it takes to fulfill the need.

This formula suggests that the Latency Efficient Market Hypothesis is achieved when the ratio of expected cost to expected time is minimized. In other words, the market is most efficient when the cost of fulfilling a need is low relative to the time it takes to fulfill that need.

To further optimize this formula, additional variables could be added such as the quality of the product or service, the perceived value of time-based currency, and the availability of resources within the market.

Overall Latency

$$L = (E + C + P + D + S) / N$$

where L represents the overall latency of the economic system, E represents the latency of extraction and conversion of resources to materials, C represents the latency of converting materials into products, P represents the latency of production, D represents the latency of distribution, S represents the latency of consumption, and N represents the total number of economic participants.

Each variable can be calculated using various methods such as time-study analysis, production process analysis, or data analysis of consumer behavior. By understanding the overall latency of the economic system, participants can optimize their actions and improve the efficiency of the system as a whole.

Latency of Needs

$L = (D + T) - P$

where L represents the latency or delay in fulfillment, D represents the time required for distribution or delivery of goods or services, T represents the time required for processing or production of goods or services, and P represents the time at which the order was placed or the need was identified.

This formula takes into account the time required for processing and distribution, as well as the time at which the need was identified or the order was placed. By subtracting the processing and distribution time from the time of order placement, we can calculate the total latency or delay in fulfillment.

For example, if an order is placed on Monday ($P = 0$), and it takes two days to process ($T = 2$) and one day to distribute ($D = 1$), the total latency or delay in fulfillment would be:

$L = (1 + 2) - 0 = 3$

This means that the individual would receive the goods or services on Thursday, three days after the order was placed. By analyzing and optimizing this formula, the decentralized autonomous economy can aim to minimize latency and provide faster and more efficient fulfillment of needs for its participants.

NR/HR/AR Basket

Time-Wrapped Basket of Natural Resources, Human Resources & Artificial Resources

$TWB = (\alpha * NR) + (\beta * HR) + (\gamma * AR)$

Where:

TWB = Time-wrapped basket

NR = Value of natural resources

HR = Value of human resources

AR = Value of artificial resources

α, β, and γ = Weights representing the relative importance of each resource type

The weights α, β, and γ could be determined based on market demand and availability of each resource type. The value of each resource type could be determined based on factors such as supply and demand, quality, and efficiency.

For example, if the weights were determined to be α = 0.4, β = 0.3, and γ = 0.3, the formula would calculate the time-wrapped basket as 40% natural resources, 30% human resources, and 30% artificial resources. If the values of each resource were NR = $100, HR = $50, and AR = $75, the time-wrapped basket would be:

TWB = (0.4 * 100) + (0.3 * 50) + (0.3 * 75) = 40 + 15 + 22.5 = $77.5

This formula can be used to create a variant of a time-based currency that is backed by a basket of resources, providing stability and value to the currency.

Time-based Meritocracy Score

Time-based currency meritocracy formula: TCM_t = (1 - (1 / (TRP_t + 1))) * TP_t

Where:

TCM_t = time-based currency meritocracy score at time t

TRP_t = time-based currency perceived value ratio at time t

TP_t = total production time at time t

This formula calculates the meritocracy score of an individual's time-based currency earnings by multiplying their total production time by a factor based on the perceived value ratio of time-based currency to traditional currency.

Meritocratic Value of Time-based Currency

Value of Time-Based Currency (V) = (p * q * t) / (w * c)

Where:

p = productivity coefficient (a measure of how much work is done in a given time period)

q = quality coefficient (a measure of how well the work is done, taking into account factors such as accuracy and attention to detail)

t = time spent on task

w = weighted average of productivity coefficients for all individuals in the economy

c = weighted average of quality coefficients for all individuals in the economy

The productivity and quality coefficients can be determined through a combination of objective measurements (such as output quantity and error rates) and subjective evaluations (such as feedback from supervisors or customers). The weighted averages of these coefficients for all individuals in the economy can serve as benchmarks for comparison.

This formula enables a meritocratic approach to time-based currency, as it rewards individuals who are more productive and produce higher quality work in a given amount of time. The value of time-based currency is not solely based on the amount of time spent, but also takes into account the value added through productivity and quality.

Meritocracy Factor

Meritocracy Factor = (Sum of Merit Scores / Total Number of Economic Agents) x (1 + Merit Multiplier)

Where:

Sum of Merit Scores: the total sum of merit scores assigned to each economic agent based on their skills, knowledge, experience, and performance

Total Number of Economic Agents: the total number of economic agents in the meritocratic time-based economy

Merit Multiplier: a multiplier factor that reflects the importance and weight assigned to meritocracy in the overall value system of the economy

This formula takes into account the meritocracy factor by considering the sum of merit scores assigned to each economic agent, divided by the total number of economic agents. The formula also includes a merit multiplier, which reflects the relative importance and weight assigned to meritocracy in the overall value system of the economy. By incorporating the meritocracy factor into the time-based value calculation, the formula ensures that the value of goods and services produced in the meritocratic time-based economy is based on the merit and performance of economic agents, rather than on external factors such as wealth or power.

Productivity Factor

Productivity Factor = ((Total Time-Based Currency Earned / Total Time Spent) x (Quality Score / 100) x (Merit Factor)) / (Average Wage in Time-Based Currency)

Where:

Total Time-Based Currency Earned = the total amount of time-based currency earned by the economic agent for a given period of time

Total Time Spent = the total amount of time spent by the economic agent on work-related activities during the same period of time

Quality Score = the score assigned to the quality of the work produced by the economic agent, based on objective criteria

Merit Factor = a factor that accounts for the individual's merit and contribution to the overall success of the organization or economy

Average Wage in Time-Based Currency = the average wage paid to economic agents in the same or similar line of work in the time-based economy

This formula calculates the productivity factor for a given economic agent, taking into account the total amount of time-based currency earned, the total time spent on work-related activities, and the quality of the work produced. It also factors in the individual's merit and contribution to the overall success of the organization or economy, as well as the average wage paid in the time-based economy for similar work. The productivity factor can be used to assess the efficiency and effectiveness of individual economic agents, as well as to compare the productivity of different agents within the same or similar line of work.

Quality Rating Score

Quality Rate Score = (Average Rating Score / Maximum Possible Rating Score) * (Average Completion Rate / Maximum Possible Completion Rate) * (1 - Average Rejection Rate / Maximum Possible Rejection Rate) * 100

Where:

Average Rating Score is the average score given by clients or supervisors on completed tasks, ranging from 1 to 10.

Maximum Possible Rating Score is the highest rating that can be given, usually 10.

Average Completion Rate is the average percentage of completed tasks out of total assigned tasks.

Maximum Possible Completion Rate is the maximum possible percentage of completed tasks that can be achieved.

Average Rejection Rate is the average percentage of tasks that are rejected by clients or supervisors.

Maximum Possible Rejection Rate is the maximum possible percentage of tasks that can be rejected.

The formula takes into account the average rating score, the completion rate, and the rejection rate to provide an objective measure of the quality of work performed by an individual or a group. It also accounts for the maximum possible scores for each metric to ensure fairness and objectivity. The Quality Rate Score can be used to compare the quality of work between different individuals or groups, as well as to monitor the overall quality of work in the meritocratic time-based economy.

Weighted Productivity Score

Weighted Productivity Score = (Productivity Score x Quality Score) / 100

Where,

Productivity Score = (Total Time-Based Currency Earned / Total Time Spent) x 100

Quality Score = (Total Quality Rating / Total Completed Tasks) x 100

Skill Level

Skill Level = (Skill Proficiency x Skill Weight) / (Skill Difficulty + Skill Diversity)

Where:

Skill Proficiency: measures the level of proficiency or mastery of a particular skill, based on objective standards and assessments.

Skill Weight: measures the relative importance or relevance of the skill in a given context or field.

Skill Difficulty: measures the level of difficulty or complexity of the skill, based on factors such as cognitive load, training time, and experience required.

Skill Diversity: measures the range or variety of skills possessed by an individual, taking into account both breadth and depth of knowledge.

This formula takes into account both the proficiency and weight of a skill, as well as the difficulty and diversity factors that can impact its level. The skill weight allows for the consideration of the relative importance of the skill in a given context, while the difficulty and diversity factors help to account for the challenges and opportunities associated with its acquisition and use. The resulting skill level can be used to compare and evaluate the relative expertise or proficiency of individuals or groups across different skills and domains.

Skill Diversity

Skill Diversity = (Total Number of Unique Skills Possessed / Total Number of Skills Required) x (Average Depth of Knowledge Across Skills)

Where:

Total Number of Unique Skills Possessed = the total number of distinct skills possessed by an individual

Total Number of Skills Required = the total number of skills required for a particular role or task

Average Depth of Knowledge Across Skills = the average level of knowledge and expertise possessed by the individual across all of their skills

This formula calculates the Skill Diversity of an individual, taking into account both the range and depth of their skills. It factors in the total number of unique skills possessed by the individual and the total number of skills required for a particular role or task. The formula also takes into account the average depth of knowledge possessed by the individual across all of their skills. Skill Diversity can be used to assess the versatility and adaptability of an individual in a given context or field, as well as to compare the skill sets of different individuals within the meritocratic time-based economy.

Skill Difficulty

Skill Difficulty = (Cognitive Load x Training Time x Experience Required) / Skill Proficiency

Where:

Cognitive Load refers to the amount of mental effort or processing required to perform the skill effectively.

Training Time refers to the amount of time required to train and develop proficiency in the skill.

Experience Required refers to the level of prior experience or knowledge necessary to perform the skill effectively.

Skill Proficiency is a measure of the individual's mastery or level of proficiency in the skill.

This formula takes into account the different factors that contribute to the difficulty or complexity of a particular skill. The cognitive load, training time, and experience required are multiplied together to represent the overall level of difficulty. This value is then divided by the individual's skill proficiency to normalize for differences in ability. The resulting value represents the relative difficulty of the skill, taking into account both objective factors and individual proficiency.

Skill Proficiency

Skill Proficiency = ((Total Correct Answers / Total Questions) / Difficulty Factor) x (Skill Weight / Total Skill Weights) x (Merit Score / Total Merit Scores)

Where:

Total Correct Answers: the total number of questions answered correctly in a standardized assessment of the particular skill

Total Questions: the total number of questions in the standardized assessment

Difficulty Factor: a factor that takes into account the overall difficulty of the standardized assessment, based on factors such as cognitive load and time required to complete the assessment

Skill Weight: the weight or importance of the particular skill in the context of the individual's work or responsibilities, as determined by a standardized job analysis or similar tool

Total Skill Weights: the total sum of all skill weights for the individual's job or responsibilities

Merit Score: the individual's score on a standardized assessment of merit, which measures a combination of knowledge, skills, and abilities relevant to the individual's job or responsibilities

Total Merit Scores: the total sum of all merit scores for the individual's job or responsibilities

This formula takes into account the individual's proficiency in the particular skill, as measured by a standardized assessment. It also factors in the difficulty of the assessment, the weight of the skill in the individual's job or responsibilities, and the individual's overall merit score. The Skill Proficiency formula can be used to assess an individual's level of skill mastery and to identify areas for improvement and development.

Time-based Money Supply

$$M(t) = M(0) + \sum(i=1 \text{ to } n) (P(i) - C(i))$$

where M(t) represents the money supply at time t, M(0) represents the initial money supply, P(i) represents the amount of time-based currency produced by individual i through completing time-wrapped tasks and actions, and C(i) represents the amount of time-based currency burned by individual i through spending or using their currency of time.

This equation assumes that the total money supply in the time-based economy is equal to the initial money supply plus the net amount of currency produced and consumed by all individuals participating in the economy. It also assumes that the money supply is not influenced by external factors such as central bank policies or inflation rates, but rather is solely determined by the amount of time-based currency produced and consumed by individuals within the decentralized autonomous economy.

Logarithmic Network Model

Value of Time-based Decentralized Autonomous Economy = k * log(N)

where N is the number of participants and k is a constant. In this model, the value of the system increases logarithmically with the number of participants, indicating that the value of the system is proportional to the number of connections between participants. As more participants join, there are more connections and opportunities for value creation within the system, further reducing the reliance on the traditional economy.

Inverse Reliance on Traditional Economy

One way to mathematically represent the relationship between the quantity of participants and the reliance on the traditional economy in the Time-based Decentralized Autonomous Economy is through a power law function. The power law function describes a relationship where a small number of participants have a disproportionately large impact on the system as a whole, while the majority of participants have a smaller impact.

Reliance on traditional economy = k * N^(-a)

where N is the number of participants in the Time-based Decentralized Autonomous Economy, k is a constant, and a is a scaling factor that determines the steepness of the curve.

As N increases, the reliance on the traditional economy decreases exponentially. This is because as more participants join the system, they are able to fulfill more of their own needs and the needs of other participants within the system, reducing the need for external inputs from the traditional economy. Additionally, as the system grows, it becomes more efficient and self-sufficient, further reducing the reliance on the traditional economy.

Participant() Increase, Reliance Decrease

As the quantity of participants in the time-based economy increases, the reliance on the traditional economy decreases. This is because as more people participate in the time-based economy, more goods and services are being produced and consumed within the system, reducing the need to rely on external sources. The equation for this could be something like:

Reliance on Traditional Economy = (1 - % of GDP produced in Time-based Economy) x 100

For example, if 50% of a country's GDP is produced in the time-based economy, the reliance on the traditional economy would be:

(1 - 0.5) x 100 = 50%

This means that the traditional economy is still relied upon for 50% of the country's needs, but as the time-based economy continues to grow, this reliance will decrease.

Specific examples of how this works could be seen in industries like food and agriculture. As more people participate in the time-based economy, there may be an increase in the number of people growing their own food, sharing their excess produce with others, or even trading time-based currency for locally grown produce. This reduces the need to rely on the traditional economy for food and agriculture-related goods and services.

Self-Bootstrapping

V = N(N-1) / T

where V represents the value of the economy, N represents the number of participants, and T represents the time it takes for each participant to complete a time-wrapped task.

This equation assumes that the value of the economy is proportional to the number of interactions between participants, which is given by the combination formula of N choose 2 (N-1). The division by T represents the speed at which value is generated, which is a function of how quickly participants can complete tasks.

As the number of participants increases, the value of the economy grows exponentially due to the combinatorial nature of interactions. This growth is further amplified by the autogenous nature of the economy, as participants are incentivized to contribute more value over time. Ultimately, this leads to a self-bootstrapping effect where the economy is able to sustain itself and grow without relying on external factors.

Exchange Rate()

Fiat/CBDC cannot be converted to Time Currency, but Time Currency can be converted to Fiat/CBDC.

Assuming that in a certain time-based economy, the demand for time-based currency is 500 units and the supply of time-based currency is 1,000 units. The inflation rate of the traditional currency is 3% and the inflation rate of the time-based currency is 1%. Finally, the perceived value ratio of time-based currency to traditional currency is 2:1.

Using the formula:

Exchange Rate = (Supply of Time-based Currency / Demand for Time-based Currency) * (Inflation Rate of Time-based Currency / Inflation Rate of Traditional Currency) * (Perceived Value Ratio of Traditional Currency to Time-based Currency)

Exchange Rate = (1,000 / 500) * (1% / 3%) * (1:2)

Exchange Rate = 2 * 0.333 * 1:2

Exchange Rate = 0.333

This means that one unit of time-based currency would be exchanged for 0.333 units of traditional currency in this market.