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CO-CLUSTER HOMOTOPY QUEUING MODEL IN NONLINEAR ALGEBRAIC TOPOLOGICAL STRUCTURE FOR IMPROVING POISON DISTRIBUTION NETWORK COMMUNICATION

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Abstract. Nonlinear network creates complex homotopy structural communication in wireless network medium because of complex distribution approach. Due to this multicast topological connection structure, the queuing probability was non regular principles to create routing structures. To resolve this problem, we propose a Co-cluster homotopy queuing model (Co-CHQT) for Nonlinear Algebraic Topological Structure (NLTS-) for improving poison distribution network communication. Initially this collects the routing propagation based on Nonlinear Distance Theory (NLDT) to estimate the nearest neighbor network nodes under*non linear at* $x_{(a,b)\rightarrow} ax^2 + bx^2 = c$. Then Quillen Network Decomposition Theorem (QNDT) was applied to sustain the non-regular routing propagation to create cluster path. Each cluster be form with co variance structure based on Two unicast 2(n+1)-Z network. Based on the poison distribution theory $X_{(a,b)} \neq \mu(C)$, at number of distribution routing strategies weights are estimated based on node response rate. Deriving shorte;'l/st path from behavioral of the node response, Hilbert –Krylov subspace clustering estimates the Cluster Head (CH) to the routing head. This solves the approximation routing strategy from the nonlinear communication depending on Max- equivalence theory (Max-T). This proposed system improves communication to construction topological cluster based on optimized level to produce better performance in distance theory, throughput latency in non-variation delay tolerant.

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1. Introduction

Non liner equation become a non-residual solution for all dynamic queuing theory, specifically the network of data communication node become dynamic in structural approach. This information allows to determine the queue theory of distance estimation to make topological structure. Even though the multiple queues, makes best linear equality which queue to presents to transfer data in best homotoplogical structure [1-5]. Unfortunately, delays associated with delay information are common because of complex problems. The information is losses due to response of node become varying distance in non-cluster topology structure, or it may long queening to process the after receiving the information. The communication system are nonlinear because of dynamic equivalent [6-11]. The information become losses due to delay failures on packet loss, tolerance which can cause unwanted vibrations in the queue. However, the communication nodes become best to make dominant homotophy by applying the poison queuing process defensive on quillen theory to make best topological approach. This construct best topology model by queuing theory of approach on nonlinear equation and solving the equivalence of routing structure in network. Then applying the Hilbert –Krylov subspace clustering to group the shorthanded arrival of low distance nodes depending on the max equivalence theory[12-17].

2. Consonant queuing model

Definition 2.1. Algebraic topology
Algebraic topology is a branch of mathematics that uses tools from abstract algebra to study topological spaces. The basic goal is to find algebraic invariants that classify topological spaces up to homeomorphism, though usually most classify up to homotopy equivalence. Although algebraic topology primarily uses algebra to study topological problems, using topology to solve algebraic problems is sometimes also possible. Algebraic topology, for example, allows for a convenient proof that any subgroup of a free group is again a free group.

The nonlinear equation are consonant due to varying time difference in nonequivalence model. This constraints, the network nodes are infinite due to execution based on the arrival rate '$\lambda > 0$' at initializations at each process 'p' be $0 < 1 < n$ at specific time of interval. Each queue dynamically change the process 'p' be arrival be at regular interval. So the length of queue be varied during the structure of topology be varying. The process of nonlinear point difference by exponential representation are represented as,

$$p_i\left(q\left(t\right),\Delta\right) = \frac{\exp(-q_i(t-\Delta))}{\exp\left(-q_1\left(t-\Delta\right)\right)\ +\exp(-q_2(t-\Delta))} \tag{1}$$

By applying the multinomial logic model (MNL) the regular interval between the queues are balanced the number of process have equivalence on dynamic representation in length of process to complete at't' interval. Regular interval process at each process p.

Let ‘P’ be 0 < 1 < n+1 $\exp(-q_i(t-\Delta))$

From the regular interval qi (t) is the regular interval at time (t)based on the node arrival in between communication medium in queue. From that arrival delay response be in passion consonant model $\Delta \ > 0$ similarly as inλ, the distributed time be ‘p’ be 0 < 1 < n+1 because of dynamic execution of node arrival at specific time. The network simulations are depends on execution dependencies on nod presentation in queuing handles length.

$$q_1\left(t\right)=\lambda.\frac{\exp(-q_1(t-\Delta))}{\exp\left(-q_1\left(t-\Delta\right)\right)\ +\exp(-q_2(t-\Delta))}\ -\mu q_1\left(t\right) \quad (3)$$

Where q1 and g2 are get a regular interval between the specific evaluation node arrival at each process P in Time‘t’.

$$q_2\left(t\right)=\lambda.\frac{\exp(-q_2(t-\Delta))}{\exp\left(-q_1\left(t-\Delta\right)\right)\ +\exp(-q_2(t-\Delta))}\ -\mu q_2(t) \quad (2)$$

For t >0 with preliminary disorder quantified by nonnegative incessant purpose $f_1 and\ f_2$

$$q_1(t)=f_1(t),q_2(t)=f_2(t),t\epsilon[-\Delta,.0] \quad (3)$$

It is a queuing of nonlinear equation be defined by when the sum and the difference of $q_1 and\ q_2$ are taken between regular intervals. The system is then reduced to the equation
$v_1\left(t\right)\ =\ q_1\left(t\right)-\,q_2\left(t\right)\ =\ \lambda\tanh\left(-\frac{1}{2}v_1(t-\Delta)\right)-\,\mu v_1(t)$, from both the node arrtival at regular interval

$$v_2\left(t\right)=q_1\left(t\right)+q_2\left(t\right)=\lambda-\mu v_2(t) \quad (4)$$

From the literature [3], the v2(t) is solvable by the equivalent v1(t) is presented in p.Many variance state of nonlinear functionality, they have asymptomatic analysis to demonstrate the uniqueness and consistency of a slow oscillating time solution occurring under specific parameter limits from the frequent representing. To complete these results, we create the approximate iteration between the two variance nodes based on the distributed time delay ‘n’ node representation.

3. Constant delay model

The constant delay model is represented as queuing system progress at the time of behavior. This delay tolerance at time of representing medium at specific period d of evolution. So the nonlinear have minute delays at regular interval of time between the equilibrium variance levels.
Theorem

$$For\ sufficiently\ small\Delta, the\ unique$$
$$equlibrium\ to\ the\ system\ of\ N\ equations,$$

$$q_1\left(t\right)=\lambda.\frac{\exp\left(-q_i\left(t-\Delta\right)\right)}{\sum_{j=1}^{N}\exp\left(-q_j\left(t-\Delta\right)\right)}-\mu q_i\left(t\right) \qquad \forall i=1,2,\ldots\ldots\ldots.N, \quad (5)$$

Is given by,

$$q_1^* = \frac{\lambda}{N\mu} \qquad \forall i = 1, 2, \ldots\ldots\ldots N \tag{6}$$

Proof

The queues are formalized as equilibrium state is presented by,

$$q_1^* = q_2^* = \frac{\lambda}{2\mu} \tag{7}$$

'

Next, let us examine the stability of the equation q_1^* and $\widetilde{v_2}(t)$, which is indomitable by the constancy of the linear structure of the comparisons. So, the distribution network system in a straight line, divide the variables, and reduce the system to one of two unknown functions.

$$\widetilde{v_2}(t) = -\frac{\lambda}{2} \, . \, \widetilde{v_2}(t-\Delta) - \mu\widetilde{v_2}(t) \tag{8}$$

Supposing an explanation of the procedure$\widetilde{v_2}(t) = exp(\wedge t)$, the appearances equivalence is

$$\Phi(\Lambda, \Delta) = \Lambda + \frac{\lambda}{2}\, exp(-\Lambda\Delta) + \mu = 0 \tag{9}$$

The equilibrium is stable state from all the equivalent time represent the eigenvalues \ Lambda is negative. By the specific representation of the features the delay is occurs periodically the infinite at complex roots make easier to transfer the real part of the data.

4. Delay aware running time

One way to establish range rotational stability is with a slow flow mode or a multi-volume mode. This method was previously used in distributed differential equation systems. Alternative average way to regulate the permanency of the limit cycle is to show that the Flouted index has a negative region to identify the optimal path due to the delay in transmission.

This theorem follows the first approach (slow flow mode), but deliberately incorporates the Flocked high-speed method, which defines the number of nodes with the highest level of support for the benefit of the time dependences node consideration. Consider the mass multiplication of q1 and q2 for equilibrium nodes containing more weight. The resulting equation can be divided using the function of interest given in the following equation.

$$\widetilde{v_2}(t) = \lambda\left(-\frac{\widetilde{v_2}(t-\Delta)}{2} + \frac{\widetilde{v_2^3}(t-\Delta)}{24}\right) - \mu\widetilde{v_2}(t) \tag{10}$$

For the details see of the appendix .we set $\widetilde{v_2}(t) = \sqrt{\epsilon}x(t)$ in order to prepare the non linear differential equation for the perturbation node support and replace the independent variable t by two new time dependent variables. The

$\xi = \omega t$ $(stretched\ time)\ and\ \eta = \epsilon t(slow\ time\ )$ The delay and frequency are expanded about the Hopf values,$\Delta = \Delta_{cr} + \epsilon\alpha, \omega = \omega_{cr} + \epsilon\beta$, so x becomes

$$x = \frac{dx}{dt} = \frac{\partial x}{\partial \xi}\frac{d\xi}{dt} + \frac{\partial x}{\partial \eta}\frac{d\eta}{dt} = \frac{\partial x}{\partial \xi} \bullet (\omega_{cr} + \epsilon\beta) + \frac{\partial x}{\partial \eta} \bullet \epsilon \tag{11}$$

Iterative Taylor expansion for small level topology helps reduce the calculation for

$$x\,(t - \Delta) = x\,(\xi - \omega\Delta, \eta - \epsilon\Delta) = \tilde{x} - \epsilon\,(\omega_{cr}\alpha + \Delta_{cr}\epsilon\beta\ ).\frac{\partial \tilde{x}}{\partial \xi} - \epsilon\Delta_{cr}\frac{\partial \tilde{x}}{\partial \eta} + O(\epsilon^2) \tag{12}$$

where $x(\xi - \Delta_{cr}\omega_{cr}, \eta = \tilde{x}$.the functionm x is repersented as $x = x_0 + \epsilon x_1 + \ldots\ldots\ldots$ yielding

$$\frac{dx}{dt} = \omega_{cr}\frac{\partial x_0}{\partial \xi} + \epsilon\beta\frac{\partial x_0}{\partial \xi} + \epsilon\frac{\partial x_0}{\partial \eta} + \epsilon\ \omega_{cr}\frac{\partial x_1}{\partial \xi} \tag{13}$$

Depending on the definition of the node frequency, the delay time can reduce the transmission path. The highest level of support is provided to independent nodes based on the high level of migration support.

5. Optimal Cluster Head Distance

The straight line (nodes needed) between the nodes is the best path between the source and sink nodes for end-to-end multi-hop transmissions that take equal hexagonal cells into account when the intermediate nodes are employed appropriately. based on nodes' similarity. Data packets are sent from the source node to the sink node via the cluster's structural architecture. Assume that the distance, between each cluster head is the number of cluster heads and is obtained as follows.

$R = \sqrt{13}.r$be represent as $m = \frac{L}{D} = \frac{L}{\sqrt{13}.r}$

This distance estimation considers dynamic traffic on your network. If the rate of continuous traffic on the network is constant, the network is considered to have constant traffic. In the hexagonal cluster model, indicates the ideal distance between the hexagon's sides and the cluster head. Is the node's maximum transfer limit, and the limit should allow both nodes to send and receive data from any node in the nearby cluster. End-to-end multi-hop transmission energy consumption based on the energy consumption model stated above:

$$\begin{aligned} E_i &== E_t + E_r + E_l \\ &== \left(e_e + e_\alpha R^\beta\right) N + (e_e)\,N + e_e d_R(1 - \frac{N}{d_R}) \\ &== (2e_e + e_\alpha R_i^\beta)N \\ E_t &= m.E_i \\ &= \frac{L}{\sqrt{3}r}\left[2e_e + e_\alpha\left(\sqrt{13}r\right)^\beta\right] N \end{aligned} \tag{14}$$

To obtain the smallest amount of energy, we compute the first derivative of E_t with respect to the ideal cluster head distance, r.
let $\frac{d}{dr}\ (E_t)$

$$\frac{d}{dr}\left(E_t\right) == \frac{1}{\sqrt{3}}\left(e_\alpha N\left(\sqrt{13}r\right)^\beta\left(\beta-1\right)r^{\beta-2}-\frac{2e_eN}{r^2}\right) \tag{15}$$

The optimal distance solution from the previous equation 18 get redundant into

$$r = \frac{1}{\sqrt{13}}\left(\frac{2e_e}{(\beta-1)e_\alpha}\right)^{1/\beta}$$
$$= \frac{1}{\sqrt{3}}\left(\frac{2e_e\lambda^2 d_R}{(\beta-1)_{p_{thr}}(4\pi)^2}\right)^{1/\beta} \tag{16}$$

The loss factor at the transcoding settings that accounts for node departure from the cluster head location. This causes disparities in network traffic and across nodes. The optimal cluster head distance and cell activity in your network drop as the traffic constant and diffusion loss factor increase. The number of cluster heads and the amount of energy utilised by each cluster head are also exchanged.The cluster's sides are narrow, the number of support nodes is large, and the constant power redundancy is detrimental to the dominant stage, according to the equation. As the number of cluster heads decreases, the area of the cluster side widens, and the energy absorbed by the transmitter amplifier of each cluster head drastically increases, the cluster heads win the energy consuming.

6. Topological Network computing

The computing process get balanced through transition nodes depends on supports 'S' systems 'C' having the Number of nodes 'N'. This network are nonlinear from under process of network.

$$non\ linear\ system\ \ N_n is\ C_{2N}^N$$

The variation of nonlinear dependencies are 'i and j' relatively at transmission nodes 'y' nodes for y relatively subsequent to 'g' nodes.

$$E_j\sum_{i=1}^{N+1} y_{ji}^* E_i^* - S_j = 0$$
$$E_j^*\sum_{i=1}^{N+1} y_{ij} E_i - S_j^* = 0$$
$$j = N_g+1, N_g+2, \ldots\ldots..N \tag{17}$$

By the conjugation Energy limit is E_j nodes complex to the subscript * nodes response

The intermediate arrival of node is 'y' new transmission support in active energy 'i' to 'j' to the each process p at the complex energy in 'j' in snon support nodes. The normalization of nodes are utilized based n number of data processed on equivalent construction nodes.The constructed as follows, $0.681f_1f_2+2.519e_1f_2+1.721f_1^2+2.519e_2f_1-1.855f_1+0.681e_1e_2+1.721e_1^2+1.074e_1-P_1=0$ $2.519f_1f_2-0.681e_1f_2-4.374f_1^2+0.681e_2f_1+1.041f_1+2.519e_1e_2-4.374e_1^2+1.855e_1-Q_1=0$ $0.681f_1f_2-2.519e_1f_2-1.235f_2+2.519f_1e_2+0.681e_1e_2+0.754e_2-1.134=0$

$$f_2^2+e_2^2-1=0$$

The process get the new factors based energy consumptions the network node get formalized from the each nodes from each process. So the 'f' contains the number of the energy retaining process from 'e' from real and imaginary parts.

7. Conclusion

We provide an unique homotopy network design approach for simultaneously solving n variable nonlinear equations with n neurons and n synchronisation in this paper. Each node restricts the communication's arrival distance, and each synchronisation begins by distributing poison. This improves both nonlinear structural communication and homotphy topological structures. It makes far less use of hardware than the alternatives. The strategy's efficacy was demonstrated by simulation results obtained after the proposed network was simultaneously assessed on a sample problem set including two linear equations. It just took a few nanoseconds to get at the solution.

Conflicts of interest : The authors declare no conflict of interest.

Data availability : Not applicable

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