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(54) Title: MULTIPLEXING AND CONGESTION CONTROL

Select flows to be combined such that resulting combination waveforms are characterized by 1902 Pa(t) + Pb(t) = X, where Pa is the probability wave for flow a Pb is the probability wave for flow b, and X is the probability of traffic

- P(traffic) can be > 1
- combined/phase shifting to create approximation of square wave
- phase shifting to meet of nstraints imposed by P(traffic) or within delay constraints for a QoS defined for the flow
- select flows having same wavelength or harmonics of same wavelength
 select so as to avoid beat frequencies

Combine selected flows to control congestion

Apply combining to plurality of flows in layer of network

- construct waveform exploiting differences in bandwidth between layers
 use flow control feedback to establish natural frequency of the waveform for a particular subnet or layer

Combine plurality of flows having different waveforms onto new flows at lower layer of the network, each with pre-determined congestion characteristics, to create set of combined flo for providing a variety of services per QoS parameters.

- combine such that flows of lower layers exhibit lower uncertainty in probal

- functions
- nce can operate in accordance with policies/parameters over a range of
- nanaged thereby operate over given ranges of QoS paran

Apply method recursively with different policies and parameters over an entire range of

- cooperating instances of identical rank form layer of a specific scope operable to manage flows of a given bandwidth range, specific QoS or scope of man instances at a higher rank generally manage lower bandwidth ranges and a
- QoS, generally have greater scope, instances at lower ranks generally have higher bandwidth ranges and manage flows with broader QoS and less scope within a range of QoS handled by a given layer, specific flows between senders and
- whilm a large of QoS latancted by a given layer, specific flows between sunders and receivers further subdivide the range of QoS
 QoS parameters may be expressed in terms of properties of the wave
 QoS or other information needed to engineer a network may be derived directly from

(57) Abstract: Methods, systems and devices for network congestion control (1904) exploit the inherent burstiness of network traffic (1902) using a wave-based characterization of network traffic (1906, 1910) and corresponding multiplexing methods and approaches.



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C. DOCUMENTS CONSIDERED TO BE RELEVANT				
Category *	Citation of document, with indication, where a		Relevant to claim No.	
X	US 5,566.175 A (DAVIS) 15 October 1996 (15.10. lines 8 et seq.	_	1-23	
X	US 6,072,800 A (LEE) 06 June 2000 (06.06.2000), Abstract, Figures 1-5, col. 5, lines 43 1-23 et seq.			
X	US 5,953,344 A (DAIL et al.) 14 September 1999 (14.09.1999), Abstract, Figures 2-19, col. 4, lines 20et seq.			
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	5, lines 36 et seq.			
	r documents are listed in the continuation of Box C.	See patent family annex.		
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Continuation of B. FIELDS SEARCHED Item 3:				
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