Networks Research Lab (NetRL)

http://www.NetRL.cs.ucy.ac.cy
Fuzzy CC (ATM, Internet, DiffServ)

• Encouraged by success of *Fuzzy Logic Control (FLC)* in robustly controlling nonlinear complex systems, especially where a *dynamic mathematical model* is impractical to obtain

• Successfully solved a range of problems in both ATM and TCP networks (Best Effort and Diff-Serv), thus also demonstrating universality of FLC approach

• Evaluated performance in OPNET and ns-2 based discrete event simulators
  – robust and effective control in large set of scenarios with widely differing traffic characteristics and topological differences, thus verifying robustness
  – good steady state and transient behaviour
  – in all cases FLC approach outperformed well known schemes reported in literature

• Since 1993, addressed many network problems using FLC

FERM – Fuzzy Explicit Marking for ATM

Figure 7: Plot of average end-to-end cell delay vs useful throughput of simulated ATM WAN under FERM congestion control. The graph was produced by varying the offered link loads generated by ABR traffic sources from 20% to 150% of the link capacities.

Figure 14: Source allowed cell rate transient response of simulated ATM WAN under FERM congestion control. At time $t = 0$, 3-hop source, $t = 0.2$ sec 1-hop $a$ source, $t = 0.4$ sec 1-hop $b$ sources, and $t = 0.6$ sec 1-hop $c$ sources start transmitting cells.

Figure 9: Plot of average end-to-end cell delay vs useful throughput of simulated ATM WAN under EPRCA congestion control. The graph was produced by varying the offered link loads generated by ABR traffic sources from 20% to 150% of the link capacities.