



## Complex Congestion Behavior in Deflection Routing

Wilson W. K. Thong and Guanrong Chen

Dept. of Electronic Engineering, City University of Hong Kong  
83 Tat Chee Avenue, Kowloon, Hong Kong SAR, P. R. China  
Email: {wilsonwk, gchen}@ee.ciyu.edu.hk

**Abstract**—Deflection routing is a mechanism to route packets. Traditional shortest path routing uses only the static topological information as input, whereas deflection routing takes into account the dynamic queue length to route a packet. In the simplest form of deflection routing, a packet being dropped due to queue buffer overflow is “rescued” and is re-routed to some other links.

Effectively, deflection routing can reduce the rate of packet drops and allows a network to carry more packets without the need of additional bandwidth. Although this is a favorable characteristic, deflection routing can lead to unstable deflecting behavior under some congestion scenario. Typically, cascading deflection can be formed. Thus, we are motivated to study deflection routing when it is operated near the point of congestion. In particular, we aim to investigate how close to the point of congestion deflection routing can operate without winding up being unstable, and how to narrow this gap as much as possible. Some observed complex dynamic behavior of deflection routing will also be reported.