

شبکه‌های مخابراتی

دکتر رجبی

دانشگاه صنعتی همدان

گروه مهندسی برق و کامپیوتر

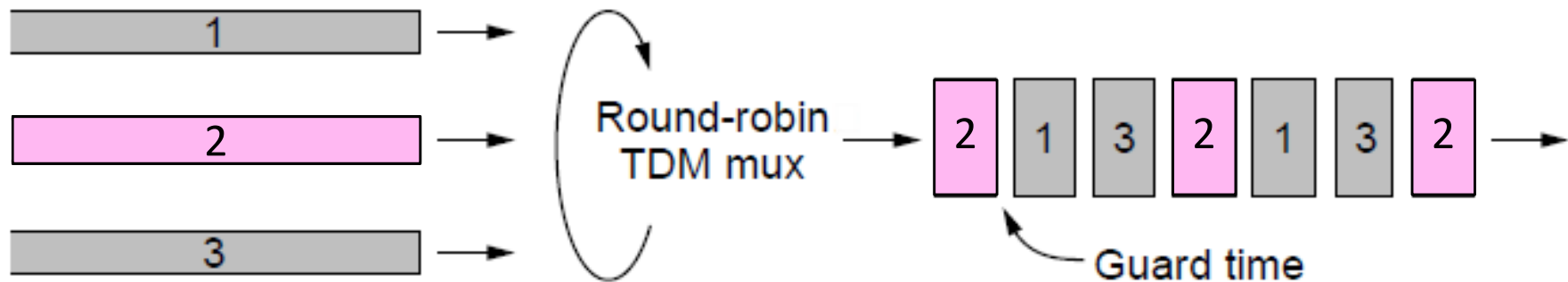
ادغام Multiplexing

Topic

- Multiplexing is the network word for the sharing of a resource
- Classic scenario is sharing a link among different users
 - Time Division Multiplexing (TDM) »
 - Frequency Division Multiplexing (FDM) »

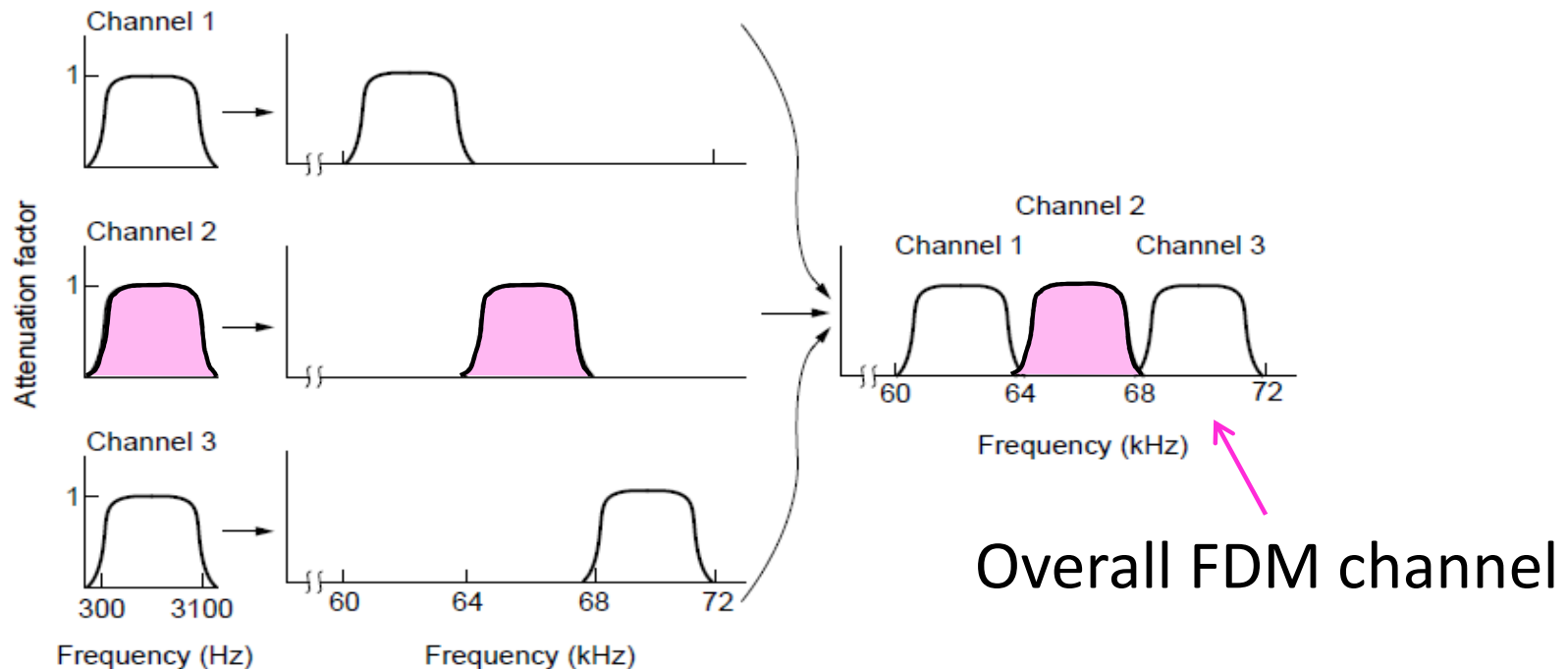
Time Division Multiplexing (TDM)

- Users take turns on a fixed schedule



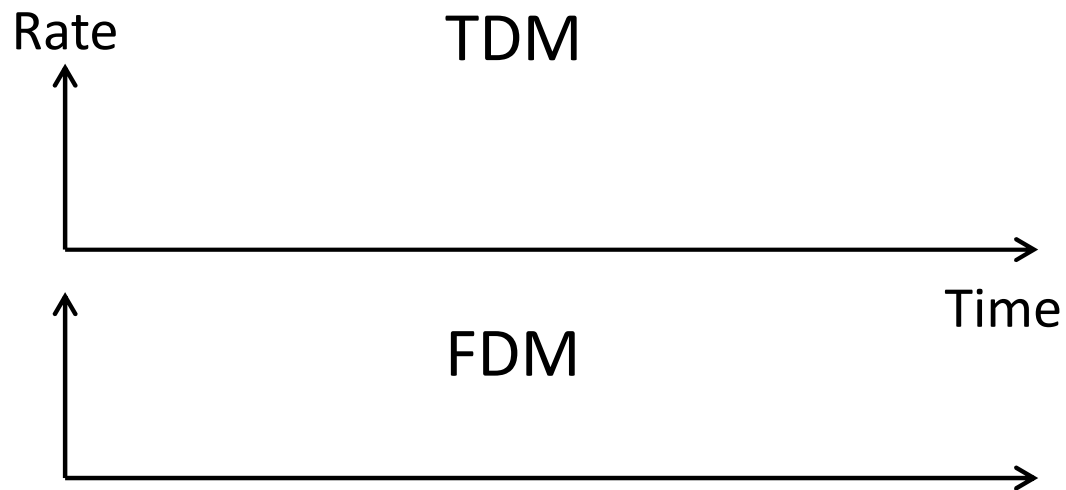
Frequency Division Multiplexing (FDM)

- Put different users on different frequency bands



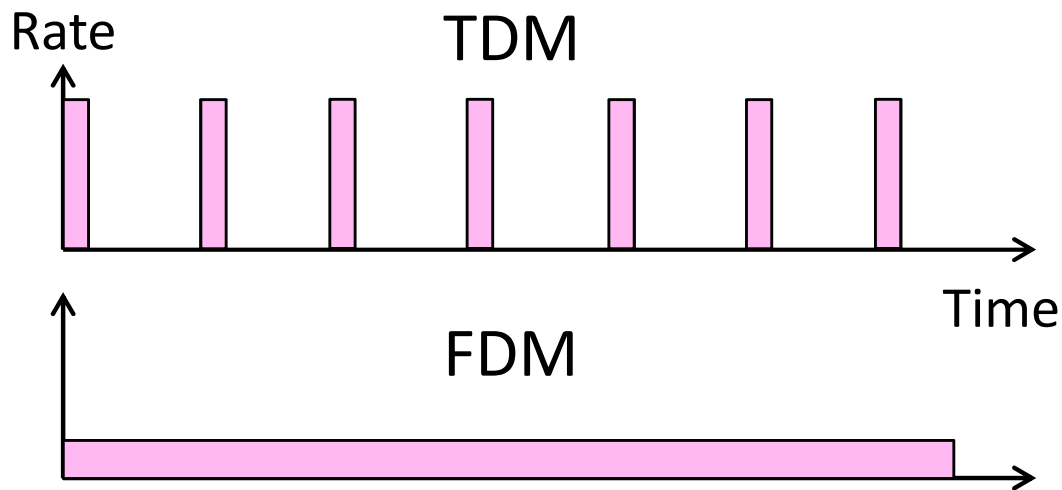
TDM versus FDM

- In TDM a user sends at a high rate a fraction of the time; in FDM, a user sends at a low rate all the time



TDM versus FDM (2)

- In TDM a user sends at a high rate a fraction of the time; in FDM, a user sends at a low rate all the time

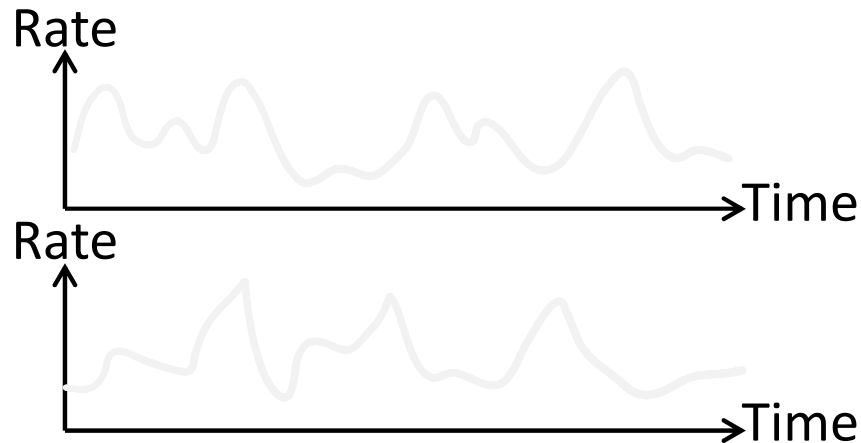


TDM/FDM Usage

- Statically divide a resource
 - Suited for continuous traffic, fixed number of users
- Widely used in telecommunications
 - TV and radio stations (FDM)
 - GSM (2G cellular) allocates calls using TDM within FDM

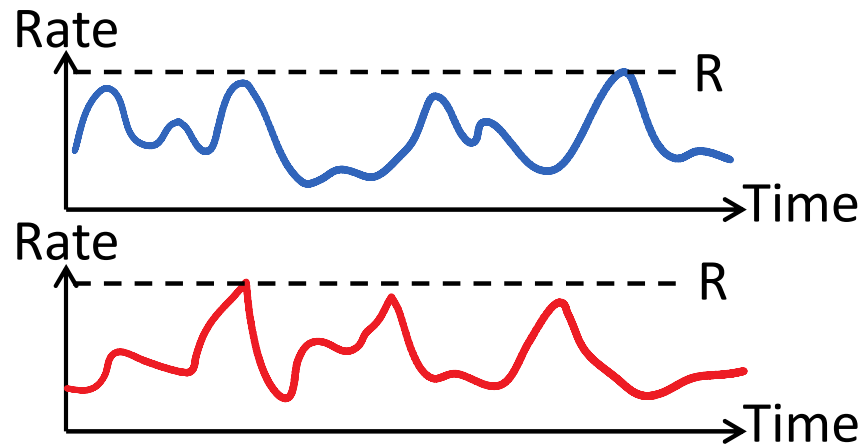
Multiplexing Network Traffic

- Network traffic is bursty
 - ON/OFF sources
 - Load varies greatly over time



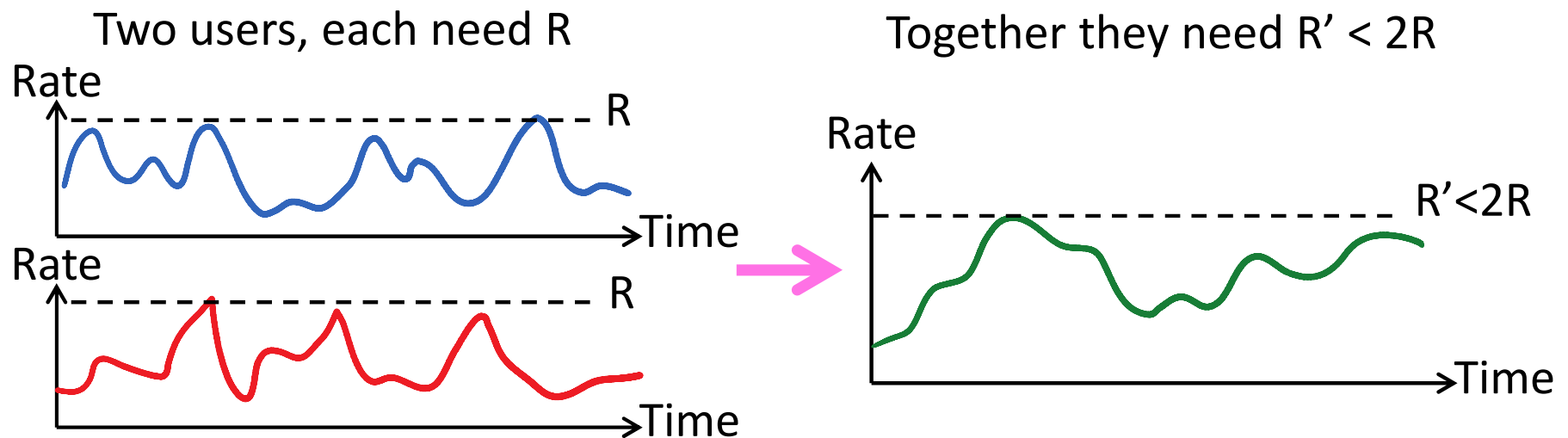
Multiplexing Network Traffic (2)

- Network traffic is bursty
 - Inefficient to always allocate user their ON needs with TDM/FDM



Multiplexing Network Traffic (3)

- Multiple access schemes multiplex users according to their demands – for gains of statistical multiplexing



Multiple Access

- We will look at two kinds of multiple access protocols
 1. Randomized. Nodes randomize their resource access attempts
 - Good for low load situations
 2. Contention-free. Nodes order their resource access attempts
 - Good for high load or guaranteed quality of service situations