

# 8.7.4 System loading

The following procedures can be used for system loading during simulation and preparation of simulation outputs.

## System loading

To determine the number of active mobile stations  $Act\_MS$  in the network:

1. Set up:
    1. Average traffic load in terms of a predefined number of users per cluster:  $N\_UL$
    2. standard deviation of log-normal shadowing  $\sigma_{shadowing}$
    3. voice activity factor  $Act\_Factor$  (fixed to 100%)
    4. target maximum noise rise over the thermal noise in the network  $\eta\_target$
    5. target C/I ( $E_b/N_{0\_target}$ ) to fulfill service requirement depending on configuration and mobility (provided by link level simulations)
    6. maximum transmit power of mobile station  $max\_MS\_Pw\_Tx$
    7. power control range -  $MS\_PC\_Rang$ :
    8. In the case that the CDMA uplink is the victim link, add the received power from the interfering system to the thermal noise power
  2. For each event:
    1. put down uniformly mobile stations at pseudo-random locations across the network and distribute speed among them
    2. Add a new mobile station in the set of active users in the network
- ○ ○ compute average path-loss from the mobile station to the base station of each cell
  - generate a log-normal pseudo-random value to add to each of the path losses to model shadow fading
  - perform a pseudo-random weighted coin-toss to determine voice activity, where 1 occurs with probability  $Act\_Factor$
  - compute required received power at the base station to meet  $E_b \left( \frac{C}{I} \right)_{uz}^{target}$ , given interference from pre-existing mobiles and other sources (  $I_{total}$  )
  - compute required transmit power of the mobile station
  - adjust the required transmit powers of the all existing mobile stations perturbed by addition of the new mobile station
  - continue the adjustment until the convergence of power control loop is achieved. A convergence criterion could be that the variation of two

consecutive transmit powers of each mobile station is within a predefined threshold.

- compare the number of active mobile stations,  $Act\_MS$ , with  $N\_UL$ 
  - if  $Act\_MS \geq N\_UL$  terminate the addition of a new mobile station in the network
  - else measure the average noise rise over the thermal noise  $\eta$  and compare it with the target noise rise limit  $\eta\_target$ 
    - if  $\eta\_target$  is reached, terminate the addition of a new mobile station in the network
    - else add a new mobile station and go to step 2b

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