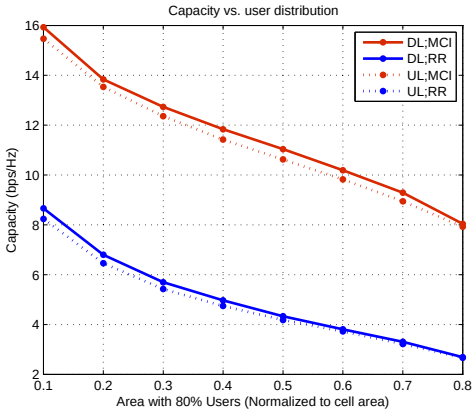

Figure 4. System capacity with respect to the area index χ

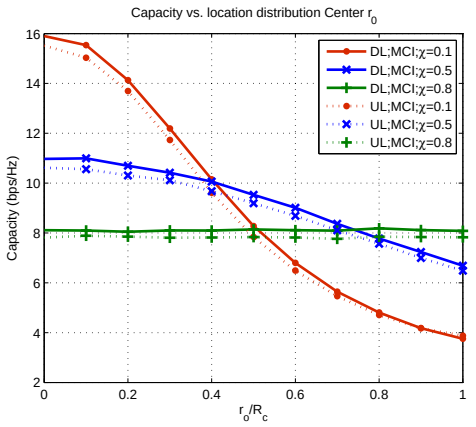

Figure 5. System capacity with respect to the user distribution center r_0 for Max-C/I scheduling

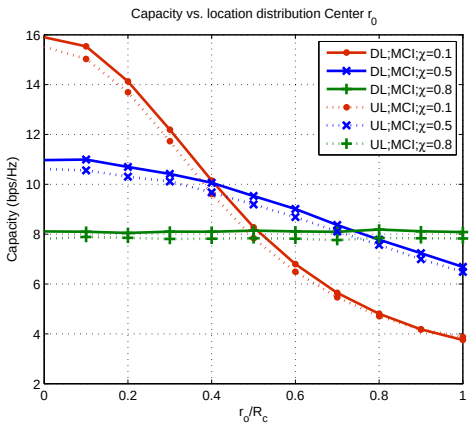

Figure 6. System capacity with respect to the user distribution center r_0 for Round Robin scheduling

with cell center, for Max-C/I scheduling and RR scheduling in both forward and reverse links, system capacity decreases as user becomes less concentration i.e. from 80% users concentrate within 10% area to 80% users concentrate within 80% area as shown in Fig.4. For Max-C/I scheduling, its capacity drops 50% and for RR scheduling, it drops nearly 75%. Also notice that Max-C/I scheduling always has a better performance than RR scheduling in terms of system capacity.

The effect of user center location on system capacity is showed in Fig.5 and Fig.6 for Max-C/I and RR scheduling respectively. As user distribution center deviates from cell center $r_0/R_c=0$ to cell edge $r_0/R_c=1$ where $r_0^2=x_0^2+y_0^2$, system capacity keeps decreasing and the smaller the area index χ, the larger the capacity decreases except at $\chi=0.8$ which corresponding to an uniform user distribution, where the deviation of user center does not influence system capacity. Notice also that capacity at high user concentration will be less than the uniform case when user center shifts to a certain location.

VI. CONCLUSION

In this paper, we propose a non-uniform user probability density function and introduce a more realistic parameter: area index, to indicate the degree of user concentration. Its effects on system capacity are addressed for both forward and reverse links under Max-C/I and Round Robin scheduling algorithms. Our results show that when user distribution center is at the cell center, cellular network always benefits from a concentrated user distribution. The higher the concentration i.e. the smaller the χ, the larger the system capacity. When shifting user distribution center, the loss of system capacity is much greater at higher user concentration. User center can be used to model hot spots in a cellular network. Future work will address the situation of multiple user centers (hot spots) within a cell.

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