Chapter 5 Conclusion and Future Work

We have introduced two adaptive power control schemes for wireless forward link data services. Compared with fixed power or periodically alternate power level schemes, both are able to adapt to time-varying traffic conditions by adjusting APT power levels and achieve several favorable performance features, in terms of delay, throughput, and traffic hot spot relief. Besides, the adaptive scheme with one threshold yields in most cases slightly better performance than the adaptive one with two hysteresis thresholds. However, the adaptive scheme with hysteresis thresholds can give rise to longer power level switching periods, which should benefit system design complexity and operation more.

The operation of adaptive schemes necessitates loading factors. We have investigated two types of loading factors. One is the remaining work of a cell and the other is part of the remaining work split according to the direction, right or left, of AT relative to its serving APT. Based on the former which does not need direction information and hence is feasible, the adaptive scheme yields only slight performance loss compared with the scheme based on the latter. We also found that for a large value of propagation path loss exponent, APT power level control may even give poorer performance than the fixed power transmission scheme, because the benefit of reducing intercell interference is minimal while forward link system suffers from capacity losses. In other words, it appears feasible to improve forward link performance through APT power level control when cell coverage areas significantly overlap. Finally, we leave

for future study the issues on how much APT power should be reduced in different fading environments, and what power control strategy is appropriate for two-dimensional network topology.