Algorithm 3 Centralized Scheme B

1) Repeat Steps 1 to 5 of Algorithm 2, i.e., initial allocation phase.
   $n = 1$, **do while** $n \leq N, n = n + 1$
2) Compute the GP based powers $p_{n,k,l}$ of the allocated users at any subcarrier n considering a high SINR regime using (14).
3) For each user allocated in a cell l at any subcarrier n, divide the left-over power equally among the remaining allocated subcarriers of the user.
4) Remove the subcarrier n from the set of unallocated subcarriers. **end**

$\mathbf{G}_{12} = [0.06 \quad 0.05;\ 0.16 \quad 0.06] \times 10^{-11}$ and $\mathbf{G}_{21}$=$[0.14 \quad 0.69;\ 0.76 \quad 0.1935] \times 10^{-11}$. The equal power allocations dictate $\mathbf{P}_1 = [0 \quad 0.5;\ 0 \quad 0.5]$ and $\mathbf{P}_2 = [0.5 \quad 0;\ 0.5 \quad 0]$ which leads to an average network throughput of 11.8392 bps/Hz/cell. However, computing the GP based powers results in $\mathbf{P}_1 = [0 \quad 0.53;\ 0 \quad 0.47]$ and $\mathbf{P}_2 = [0.38 \quad 0;\ 0.62 \quad 0]$ which lead to a maximum average network throughput of 17.2734 bps/Hz/cell.

D. Centralized Scheme B: Complexity Analysis

The initial allocation phase has a complexity of $O(KN^2)$ which is the same as Algorithm 1. Since (14) has L constraints and variables, the complexity of the power control phase is significantly reduced. Although this procedure restricts the degree of freedom offered by GP, numerical results show that the network throughput remains comparable with reduced complexity.

V. Distributed Resource Allocation Scheme

In the centralized strategy, we assume that $\chi_{n,k,l}$ is known, i.e., every BS knows the interfering gains offered by its users to the neighboring BSs. The interfering gains are based on path loss, shadowing and fading. Assuming the knowledge of local user positions at each BS, the path loss of local users toward the first tier of interfering cells can be determined, however, the knowledge of shadowing and fading gains is difficult to assume in practical scenarios. Thus, in the distributed approach, we compute our results without using the knowledge of shadowing and fading interfering gains.

Each BS performs the subcarrier allocations without taking ICI into account. In other words we compute single cell near optimal allocations using Algorithm 1. The allocation decisions are