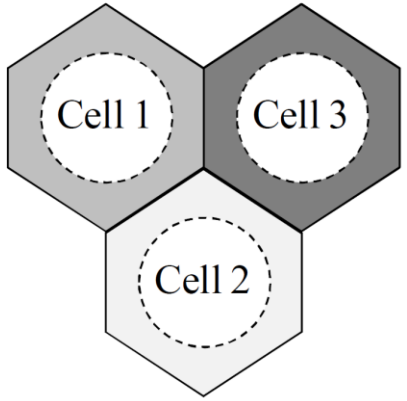
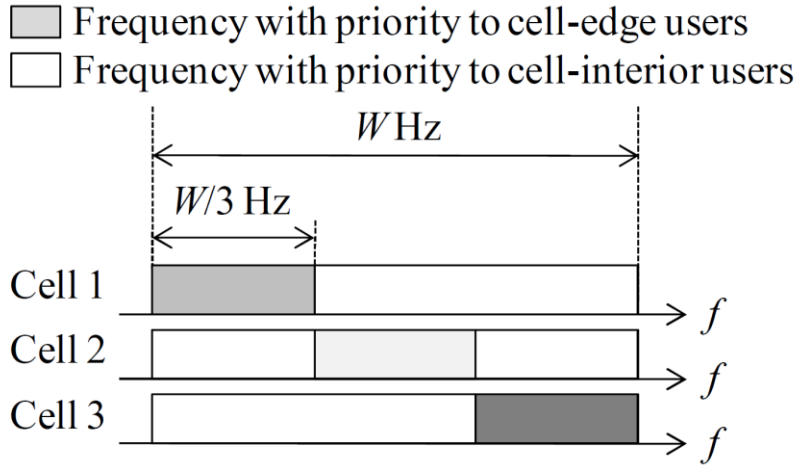
Mac Layer Aspects: Scheduling Resource Blocks with Considerations of Fairness (1/3)

- In [3], a scheduling method applying fractional frequency reuse (FFR) and weighted proportional fair (PF)-based scheduling is proposed.
- FFR divides users spatially (cell-edge or cell-interior) and allocates frequency resources accordingly.
- Soft FFR relax the restriction for NOMA with SIC, since SIC achieve gains when users with bad channel condition and those with good are multiplexed.





Mac Layer Aspects: Scheduling Resource Blocks with Considerations of Fairness (2/3)

- Here $R_b(k;t)$ denotes the rate of user k at frequency block b and at time slot t. $T(k;t+1)$ denotes the estimated average throughput.
- $f_b(S)$ is the scheduling metric for user set S at block b, and S_b are the users to be scheduled.

$$T(k;t+1)=\left(1-\frac{1}{t_c}\right)T(k;t)+\frac{1}{t_c}\left(\frac{1}{B}\sum_{b=1}^{B}R_b\left(k;t\right)\right)$$

$$f_b(S)=\prod_{k\in S}\left(1+\frac{R_b(k\mid S;t)}{(t_c-1)T^{\gamma}(k;t)}\right)$$

$$S_b=\arg\max_{S} f_b(S)$$

Mac Layer Aspects: Scheduling Resource Blocks with Considerations of Fairness (3/3)

- In FFR scheduling metric is affected by the frequency block access policy, and coefficient $\alpha_b(k)$ (no less than 0) adjust the soft priority to users that are cross-accessing (e.g. cell-edge users access inner-band).

$$f_b(S) = \prod_{k \in S} \left(1 + \frac{\alpha_b(k) R_b(k \mid S; t)}{(t_c - 1) T^{\gamma}(k; t)} \right) \quad \text{and}$$

$$\alpha_b(k) = \begin{cases} \alpha_{\text{edge}}, \ b \in X_{\text{inner}}, k \in K_{\text{edge}} \\ \alpha_{\text{inner}}, \ b \in X_{\text{edge}}, k \in K_{\text{inner}} \\ 1, \ \text{otherwise} \end{cases}$$