where $\mathbf{y}_{1,k}, \mathbf{z}_{1,k} \in \mathbb{C}$ are the vectors of the received symbols and circularly symmetric complex white Gaussian noise of double-sided power spectral density $N_0/2$ at the 2 receive antennas of UE-1 respectively. $\mathbf{H}_{1,k} \in \mathbb{C}^{2 \times 2}$ is the channel matrix from eNodeB to UE-1.

In transmission mode 6, only one UE will be served in one time-frequency resource. Therefore the system equation for single-antenna UEs at the $k$-th RE is given as

$$y_k = \mathbf{h}_k^\dagger \mathbf{p}_k x_k + z_k$$

where $\mathbf{p}_k$ is given by (1). For the dual antenna UEs, the system equation for mode 6 is modified as

$$\mathbf{y}_k = \mathbf{H}_k \mathbf{p}_k x_k + \mathbf{z}_k$$

III. Multi-user MIMO mode

We now look at the effectiveness of the low-resolution LTE precoders for the multi-user MIMO mode. We first consider a geometric scheduling strategy [23] based on the selection of UEs with orthogonal precoders.