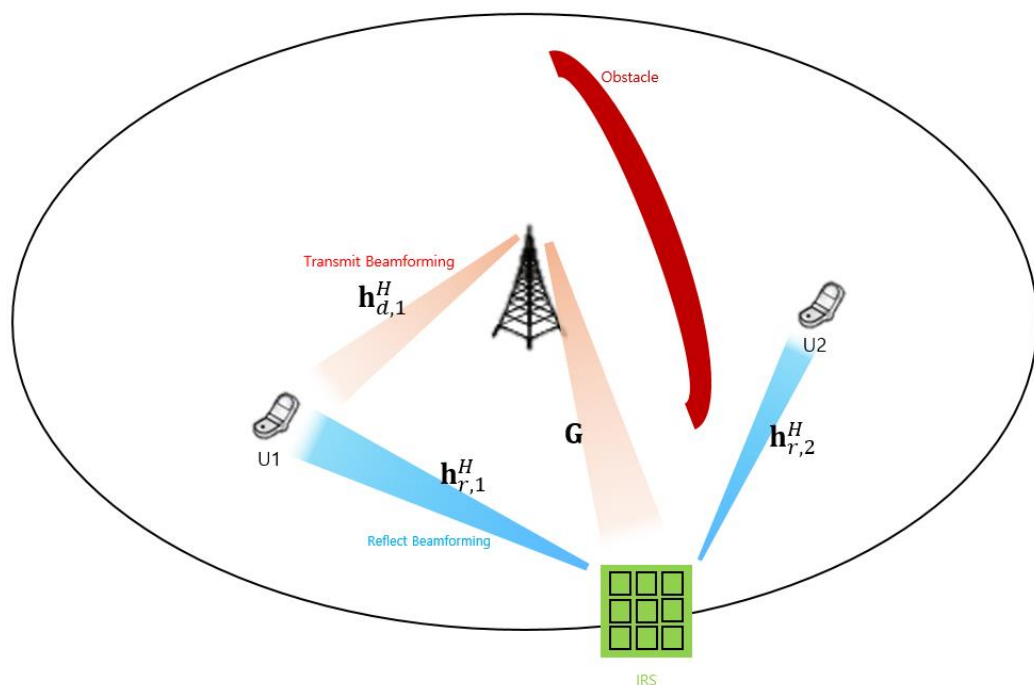제목: mmWave 대역 다중 사용자 MISO 시스템에서 IRS를 통한 Sum Rate 최적화 연구

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요약:

<System Assumption>
① Downlink
② Single Cell
③ Multi-antenna BS
④ 2 Single-antenna users
⑤ CSI is perfectly known at the BS

$$\boldsymbol{\theta} = [\theta_1, \cdots, \theta_N]^H$$
$$\boldsymbol{\Theta} = diag(e^{j\theta_1}, \cdots, e^{j\theta_N})$$
$\mathbf{w}$: Tx beamforming vector $\in \mathbb{C}^{M \times 1}$

$$y_1 = (\mathbf{h}_{r,1}^H \boldsymbol{\Theta} \mathbf{G} + \mathbf{h}_{d,1}^H) \mathbf{w} \sum_{k=1}^{2} \sqrt{p_k} s_k + n_1$$

$$y_2 = (\mathbf{h}_{r,2}^H \boldsymbol{\Theta} \mathbf{G}) \mathbf{w} \sum_{k=1}^{2} \sqrt{p_k} s_k + n_2$$

<Problem Formulation>

$$\max_{\{p_k\}, \mathbf{w}, \boldsymbol{\theta}} R_{sum}$$

$$s.t. \ C_1 : R_k \geq R_{\min}, \forall k,$$
$$C_2 : p_k \geq 0, \forall k,$$
$$C_3 : \sum_{k=1}^{2} p_k \leq P,$$
$$C_4 : |[\mathbf{w}]_m| = \frac{1}{\sqrt{M}}, \forall m,$$
$$C_5 : 0 \leq \theta_n \leq 2\pi, \forall n.$$

where C_1 is the minimum rate constraint.
C_2 indicates that the power allocation to each user should be positive.
C_3 is the total transmission power constraint that is no more than P .
C_4 is the constant modulus constraint.
C_5 indicates the phase shift range.