$$\boldsymbol{\omega}_k \overset{iid}{\sim} f(\boldsymbol{\omega}), \quad \mathrm{b}_k \overset{iid}{\sim} U[0, 2\pi]$$

$$\boldsymbol{\Omega} = [\boldsymbol{\omega}_1, \ldots, \boldsymbol{\omega}_d] \in \mathbb{R}^{p \times d},$$

$$\mathbf{b} = [\mathrm{b}_1, \ldots, \mathrm{b}_d]' \in \mathbb{R}^d,$$

$$\mathbf{z}(\mathbf{x}_i) = \sqrt{\frac{2}{d}} \cos\left(\mathbf{x}_i' \boldsymbol{\Omega} + \mathbf{b}\right),$$