

Hölder Eşitsizliği için silik altın kısım

$$a \cdot b \leq \frac{a^p}{p} + \frac{b^q}{q}$$

$$a_k = \frac{|x_k|}{A_n} \geq 0 \quad b_k = \frac{y_k}{B_n} \geq 0$$

$$A_n = \left(\sum_{k=1}^n |x_k|^p \right)^{1/p} \text{ ve } B_n = \left(\sum_{k=1}^n |y_k|^q \right)^{1/q} \text{ olsun}$$

$$\sum_{k=1}^n a_k b_k \leq \sum_{k=1}^n \frac{1}{p} a_k^p + \frac{1}{q} b_k^q \quad \text{dan}$$

$$\begin{aligned} \sum_{k=1}^n \frac{|x_k| |y_k|}{A_n B_n} &\leq \underbrace{\frac{1}{p A_n^p} \sum |x_k|^p}_{= \frac{1}{p}} + \underbrace{\frac{1}{q B_n^q} \sum |y_k|^q}_{= \frac{1}{q}} \\ &= \frac{1}{p} + \frac{1}{q} = 1 \end{aligned}$$

$$\Rightarrow \sum_{k=1}^n |x_k y_k| \leq \left(\sum_{k=1}^n |x_k|^p \right)^{1/p} \left(\sum_{k=1}^n |y_k|^q \right)^{1/q} \quad \checkmark$$

