$$a_n(X) = \sum_{k=-\infty}^{\infty} X_k \cos(k\pi/n)$$

$$b_n(X) = \sum_{k=-\infty}^{\infty} X_k \sin(k\pi/n)$$

$$\Phi(X) = F(a_1(X), b_1(X); a_2(X), b_2(X); a_3(X), b_3(X); \cdots)$$

$$\frac{\partial\Phi(X)}{\partial X_k} = \sum_{n=1}^{\infty} \left[\frac{\partial a_n(X)}{\partial X_k} \cdot \frac{\partial F}{\partial a_n} + \frac{\partial b_n(X)}{\partial X_k} \cdot \frac{\partial F}{\partial b_n} \right]$$

$$= \sum_{n=1}^{\infty} \left[\frac{\partial F}{\partial a_n} \cos(k\pi/n) + \frac{\partial F}{\partial b_n} \sin(k\pi/n) \right]$$

$$\sum_{k=-\infty}^{\infty} \frac{X_{k-1} - X_k}{1/\alpha} \cdot \frac{\partial\Phi(X)}{\partial X_k}$$

$$= \alpha \sum_{n=1}^{\infty} \left[\frac{\partial F}{\partial a_n} \sum_{k=-\infty}^{\infty} (X_{k-1} - X_k)\cos(k\pi/n) \right.$$

$$\left. + \frac{\partial F}{\partial b_n} \sum_{k=-\infty}^{\infty} (X_{k-1} - X_k)\sin(k\pi/n) \right]$$