$$f_i = a_{m_0} + a_{m_1} i^2 + \cdots + a_{m_m} i^m = \sum_{j=0}^{m} a_{m_j} i^j$$

$$N_k = \sum_{k=-L}^{L} c_k n_{i+k} = c_{-L} n_{i-L} + c_{-L+1} n_{i-L+1} + \cdots + c_L n_{i+L}$$

$$E = \sum_{k=-L}^{L} \left(f_i - n_{i+k}\right)^2 = \sum_{k=-L}^{L} \left[\left(\sum_{j=0}^{m} a_{m_j} i^j \right) - n_{i+k} \right]^2$$

$$\frac{\partial}{\partial a_{m_j}} \left\{ \sum_{k=-L}^{L} \left[\left(\sum_{j=0}^{m} a_{m_j} i^j \right) - n_{i+k} \right]^2 \right\} = 2 \sum_{k=-L}^{L} \left[\left(\sum_{j=0}^{m} a_{m_j} i^j \right) - n_{i+k} \right] \cdot i^r = 0$$

$$i^r = \frac{\partial}{\partial a_{m_j}} \left\{ \sum_{k=-L}^{L} \left[\left(\sum_{j=0}^{m} a_{m_j} i^j \right) - n_{i+k} \right] \right\}$$

$$\sum_{k=-L}^{L} \left(\sum_{j=0}^{m} a_{m_j} i^{j+r} - n_{i+k} \cdot i^r \right) = 0 \Rightarrow \sum_{k=-L}^{L} \left(\sum_{j=0}^{m} a_{m_j} \right) \cdot i^{j+r} = \sum_{k=-L}^{L} n_{i+k} \cdot i^r \Rightarrow \left(\sum_{j=0}^{m} a_{m_j} \right) \sum_{k=-L}^{L} \cdot i^{j+r} = \sum_{k=-L}^{L} n_{i+k} \cdot i^r$$

$$A(j,r) = i^j = \begin{bmatrix} (-L)^0 & (-L)^1 & (-L)^2 & \cdots & (-L)^m \\ (-L+1)^0 & (-L+1)^1 & (-L+1)^2 & \cdots & (-L+1)^m \\ \vdots & \vdots & \vdots & & \vdots \\ 0^0 & 0^1 & 0^2 & \cdots & 0^m \\ 1^0 & 1^1 & 1^2 & \cdots & 1^m \\ \vdots & \vdots & \vdots & & \vdots \\ L^0 & L^1 & L^2 & \cdots & L^m \end{bmatrix}$$

$$x^{(0)} = \left(x^{(0)}(1), x^{(0)}(2), x^{(0)}(3), \cdots, x^{(0)}(n)\right) = \left(x^{(0)}(k); k = 1,2,3,\cdots,n\right)$$

$$AGO\left\{x^{(0)}(k)\right\} = x^{(1)}(k) = \left(\sum_{k=1}^{1} x^{(0)}(k), \sum_{k=1}^{2} x^{(0)}(k), \cdots, \sum_{k=1}^{n} x^{(0)}(k), \right)$$

$$\left\{x^{(r)}(k); r = 1,2,3,\cdots,n\right\} = \left(\sum_{m=1}^{k} x^{(r-1)}(m) \right)$$

$$r^{(1)}\left(x^{(r)}(k)\right) = I^{(0)}\left(x^{(r)}(k)\right) - I^{(0)}\left(x^{(r)}(k-1)\right) - x^{(r)}(k) - x^{(r)}(k-1) = x^{(r-1)}(k)$$