ECE264A TTC Analysis: Some Def

1. xfer const(H)

1.1. 0th-order (ZV) ⋯

$H^0 = a_0$

1.2. 1st order ⋯ of ith element (inf val ith element)

$H^i = \frac{\alpha_1^i}{\beta_1^i}$

1.3. kth-order ⋯ of ith- to (i+k-1)th- element (inf val)

$H^{i\cdots(i+k-1)} = \frac{\alpha_k^{i\cdots(i+k-1)}}{\beta_k^{i\cdots(i+k-1)}}$

? 2. res

2.1. 0th-order (ZV) ⋯ of ith element

R_i^0

2.2 1st-order ⋯ of ith element (inf val jth element)

R_i^j

2.3 kth-order ⋯ of ith element (inf val jth to (j+k-1)th element)

$R_i^{j\cdots(j+k-1)}$

3. β

3.1. 1st-order ⋯ of the ith element

$\beta_1^i = R_i^0$

3.2. 2nd-order ⋯ of ith and jth element

$\beta_2^{ij} = \beta_1^i R_j^i = R_i^0 R_j^i$

3.3 kth-order ⋯ of ith to (i+k-1)th element

$\beta_k^{i\cdots(i+k-1)} = \beta_{k-1}^{i\cdots(i+k-2)} R_{i+k-1}^{i\cdots(i+k-2)}$

$= R_i^0 R_{i+1}^i \cdots R_{i+k-1}^{i\cdots(i+k-2)}$

4. τ (TC)

4.1. 0th-order (ZV) ⋯ of ith element

$\tau_i^0 = R_i^0 C_i$

4.2. 1st-order ⋯ of ith element (inf val jth element)

$\tau_i^j = R_i^j C_i$

4.3. kth order ... of ith element (inf jth to (j+k-1)th element)

$$T_i^{j\cdots(j+k-1)} = R_i^{j\cdots(j+k-1)} C_i$$

5. b (den coeff)

5.1. 1st-order den coeff

$$b_1 = \sum_{i=1}^{N} \beta_1^i C_i$$

$$= \sum_{i=1}^{N} R_i^0 C_i$$

$$= \sum_{i=1}^{N} T_i^0$$

5.2 2nd-order den coeff

$$b_2 = \sum_i^{1\le i<j\le N} \sum_j \beta_2^{ij} C_i C_j$$

$$= \sum_i^{1\le i<j\le N} \sum_j R_i^0 R_j^i C_i C_j$$

$$= \sum_i^{1\le i<j\le N} \sum_j T_i^0 T_j^i$$

5.3 kth-order coeff

$$b_k = \sum_i^{1\le i<i+1<\cdots<(i+k-1)\le N} \sum_{i+1} \cdots \sum_{i+k-1} \beta_k^{ij\cdots(i+k-1)} C_i C_{i+1} \cdots C_{i+k-1}$$

$$= (\cdots) R_i^0 R_{i+1}^i \cdots R_{i+k-1}^{i\cdots(i+k-2)} C_i C_{i+1} \cdots C_{i+k-1}$$

$$= (\cdots) T_i^0 T_{i+1}^i T_{i+2}^{i,i+1} \cdots T_{i+k-1}^{i\cdots(i+k-2)}$$

6. α

6.1. 1st-order ... of ith element

$$\frac{\alpha_1^i}{\beta_1^i} = H^i \Rightarrow \alpha_1^i = H^i \beta_1^i$$

6.2 2nd-order ... of ith and jth element

$$\frac{\alpha_2^{ij}}{\beta_2^{ij}} = H^{ij} \Rightarrow \alpha_2^{ij} = H^{ij} \beta_2^{ij}$$

6.3 kth-order ... of ith to (i+k-1)th element

$$\frac{\alpha_k^{i\cdots(i+k-1)}}{\beta_k^{i\cdots(i+k-1)}} = H^{i\cdots(i+k-1)}$$

$$\Rightarrow \alpha_k^{i\cdots(i+k-1)} = H^{i\cdots(i+k-1)} \beta_k^{i\cdots(i+k-1)}$$

7. a (num coeff)

7.1. 1st-order

$$a_1 = \sum_{i=1}^{N} \alpha_1^i C_i = \sum_{i=1}^{N} T_i^0 H^i$$

7.2. 2nd-order

$$a_2 = \sum_i^{1\le i<j\le N} \sum_j \alpha_2^{ij} C_i C_j = \sum_i^{1\le i<j\le N} \sum_j T_i^0 T_j^i H^{ij}$$

7.3. kth-order

$$a_k = \sum_i^{1\le i<i+1<\cdots<i+k-1\le N} \sum_{i+1} \cdots \sum_{i+k-1} \alpha_k^{i,i+1,\cdots,i+k-1} C_i C_{i+1} \cdots C_{i+k-1}$$

$$= (\cdots) T_i^0 T_{i+1}^i \cdots T_{i+k-1}^{i,i+1,\cdots,i+k-2} H^{i,i+1,\cdots,i+k-1}$$