$$\begin{aligned} &Q = \{q_1, q_2, \dots, q_m\} | q_i = \{v_0, v_1, v_2, v_3\} \in \mathbb{R}^3, i = [1, m] \\ &T = \{t_1, t_2, \dots, t_k\} | t_j = \{v_0, v_1, v_2\} \in \mathbb{R}^3, j = [1, k] \\ &A(p) = A(Q) + A(T) \\ &A(p) = \frac{1}{2^m} \sum_{1 \le i \le m} 2^{m-1} A(q_i) + \sum_{1 \le j \le k} A(t_j) \\ &A(p) = \frac{1}{2} \sum_{1 \le i \le m} [A(q_i) + \sum_{1 \le j \le k} A(t_j) \\ &A(p) = \frac{1}{2} \sum_{1 \le i \le m} [A(T_1) + A(T_2) + A(T_3)] + \sum_{1 \le j \le k} A(t_j) \\ &\nabla A(p) = \nabla(\frac{1}{2} \sum_{1 \le i \le m} [A(T_1) + A(T_2) + A(T_3)] + \sum_{1 \le j \le k} A(t_j)) \\ &\nabla A(p) = (\frac{1}{2} \sum_{1 \le i \le m} [AVA(T_{i1}) + \nabla A(T_{i2}) + \nabla A(T_{i3})] + \sum_{1 \le j \le k} \nabla A(t_j)) \\ &\nabla A(T_{i1}) = \frac{\cot a_{i3}(v_i - p) + \cot a_{i2}(v_j - p)}{2} \\ &\nabla A(T_{i2}) = \frac{\cot a_{i3}(v_i - p) + \cot a_{i3}(v_{i-1} - p)}{2} \\ &\nabla A(T_{i3}) = \frac{\cot a_{i3}(v_i - p) + \cot a_{i3}(v_{i-1} - p)}{2} \\ &\nabla A(p) = \frac{1}{2} \sum_{1 \le i \le m} \left[\frac{\cot a_{i3}(v_i - p) + \cot a_{i3}(v_{i-1} - p)}{2} + \frac{\cot a_{i3}(v_i - p) + \cot a_{i4}(v_{i-1} - p)}{2} \right] \\ &+ \sum_{1 \le j \le k} \frac{(\cot a_{i3}(v_i - p) + \cot a_{i3}(v_j - p) + (\cot a_{i4} + \cot a_{i1})(v_{j-1} - p)}{2} \\ &\nabla A(p) = \frac{1}{4} \sum_{1 \le i \le m} \left[\frac{(\cot a_{i3} + \cot a_{i3})(p_i - p) + (\cot a_{i4} + \cot a_{i1})((p_{i+1} - p))}{2} + \frac{1}{4} \sum_{1 \le i \le m} (\cot a_{i3} + \cot a_{i5})(p_i - p) \\ &+ \sum_{1 \le j \le k} \frac{(\cot a_{i2} + \cot a_{j5})(p_i' - p)}{2} \\ &\nabla A(p) = \frac{1}{4} \sum_{1 \le i \le m} (\cot a_{i3} + \cot a_{i5})(p_i - p) \\ &+ \sum_{1 \le j \le k} \frac{(\cot a_{i2} + \cot a_{j5})(p_i' - p)}{2} \\ &+ \sum_{1 \le i \le m} (\cot a_{i2} + \cot a_{i3})(p_{i-1} - p) \\ &+ \sum_{1 \le i \le m} (\cot a_{i2} + \cot a_{i5})(p_i' - p) \\ &+ \sum_{1 \le i \le m} (\cot a_{i2} + \cot a_{i5})(p_i' - p) \\ &+ \sum_{1 \le i \le m} (\cot a_{i2} + \cot a_{i5})(p_i' - p) \\ &+ \sum_{1 \le i \le m} (\cot a_{i2} + \cot a_{i5})(p_i' - p) \\ &+ \sum_{1 \le i \le m} (\cot a_{i2} + \cot a_{i5})(p_i' - p) \\ &+ \sum_{1 \le i \le m} (\cot a_{i2} + \cot a_{i5})(p_i' - p) \\ &+ \sum_{1 \le i \le m} (\cot a_{i2} + \cot a_{i5})(p_i' - p) \\ &+ \sum_{1 \le i \le m} (\cot a_{i3} + \cot a_{i5})(p_i' - p) \\ &+ \sum_{1 \le i \le m} (\cot a_{i3} + \cot a_{i5})(p_i' - p) \\ &+ \sum_{1 \le i \le m} (\cot a_{i3} + \cot a_{i5})(p_i' - p) \\ &+ \sum_{1 \le i \le m} (\cot a_{i3} + \cot a_{i5})(p_i' - p) \\ &+ \sum_{1 \le i \le m} (\cot a_{i3} + \cot a_{i5})(p_i' - p) \\ &+ \sum_{1 \le i \le m} (\cot a_{$$

$$\nabla A(p) = \frac{1}{4} \sum_{1 \le i \le m} (\cot \alpha_{i3} + \cot \alpha_{i6}) (p_i - p)$$

$$+\frac{1}{4} \sum_{1 \le i \le m} (\cot \alpha_{(i-1)4} + \cot \alpha_{(i-1)1})((p_i - p)) \\ +\frac{1}{4} \sum_{1 \le i \le m} (\cot \alpha_{i2} + \cot \alpha_{j5})(p'_i - p) \\ +\sum_{1 \le j \le k} \frac{(\cot \alpha + \cot \beta)(p_j - p)}{2}$$

$$\nabla A(p) = \frac{1}{4} \sum_{1 \le i \le m} (\cot \alpha_{i3} + \cot \alpha_{i6} + \cot \alpha_{(i-1)4} + \cot \alpha_{(i-1)1}) (p_i - p)$$

$$+ \frac{1}{4} \sum_{1 \le i \le m} (\cot \alpha_{i2} + \cot \alpha_{j5}) (p'_i - p)$$

$$+ \frac{1}{2} \sum_{1 \le j \le k} (\cot \alpha + \cot \beta) (p_j - p)$$

$$\nabla A(p) = \sum_{1 \le i \le m} w_i (p_i - p) + \sum_{1 \le i \le m} w'_i (p'_i - p) + \sum_{1 \le i \le k} w_j (p_j - p)$$