Area of hybrid region quads  $q_j$  and triangles  $t_k$  around  $v_i$ 

Area of Hybrid region quads 
$$q_j$$
 and thangles  $t_k$  around 
$$A(v_i) = \sum_{j=1}^m A(q_j) + \sum_{k=1}^r A(t_k)$$

Applying Mean Average Area

$$A(v_i) = \frac{1}{2} \sum_{i=1}^{m} \left[ A(t_{j1}^*) + A(t_{j2}^*) + A(t_{j3}^*) \right] + \sum_{i=1}^{r} A(t_k)$$

Applying Laplace Beltrami operator

$$\Delta(v_i) = \frac{1}{2} \sum_{i=1}^{m} \left[ \Delta(t_{j1}^*) + \Delta(t_{j2}^*) + \Delta(t_{j3}^*) \right] + \sum_{i=1}^{r} \Delta(t_k)$$

Rewriting  $\Delta(v_i)$ . We define the *Triangle Quad Laplace Beltrami Operator* 

$$\Delta(v_i) = \frac{1}{2A_i} \sum_{i=1}^{n} w_{ij} (v_j - v_i)$$