$$q_i^j f_j = \phi f_i$$
$$q_i^j g_j = \gamma g_i$$
$$f^i g_i = 0$$

$$Q_{ij}^{kl} = q_j^l \delta_i^k + q_i^k \delta_j^l + q_i^k \delta_i^l \delta_j^k + q_i^l \delta_i^k \delta_j^l$$

$$A_{ij} = f_i g_j - g_i f_j$$
$$Q_{ij}^{kl} A_{kl} = \left(q_j^l \delta_i^k + q_i^k \delta_j^l + q_i^k \delta_i^l \delta_j^k + q_i^l \delta_i^k \delta_j^l \right) \cdot (f_k g_l - g_k f_l)$$

$$= q_j^l \delta_i^k f_k g_l - q_j^l \delta_i^k g_k f_l + q_i^k \delta_j^l f_k g_l - q_i^k \delta_j^l g_k f_l$$
$$+ q_i^k \delta_i^l \delta_j^k f_k g_l - q_i^k \delta_i^l \delta_j^k g_k f_l + q_i^l \delta_i^k \delta_j^l f_k g_l - q_i^l \delta_i^k \delta_j^l g_k f_l$$
$$= q_j^l f_i g_l - q_j^l g_i f_l + q_i^k f_k g_j - q_i^k g_k f_j$$
$$+ q_i^j f_j g_i - q_i^j f_i g_j + q_i^j f_i g_j - q_i^j f_j g_i$$
$$= \gamma f_i g_j - \phi g_i f_j + \phi f_i g_j - \gamma g_i f_j$$
$$= \gamma (f_i g_j - g_i f_j) + \phi (f_i g_j - g_i f_j)$$
$$= (\gamma + \phi)\, A_{ij}$$

$$S_{ij} = f_i g_j + g_i f_j + \frac{2}{n-2}(f_i g_i + f_j g_j)$$

$$Q_{ij}^{kl} S_{kl} = \left(q_j^l \delta_i^k + q_i^k \delta_j^l + q_i^k \delta_i^l \delta_j^k + q_i^l \delta_i^k \delta_j^l \right) \cdot \left(f_k g_l + g_k f_l + \frac{2}{n-2}(f_k g_k + f_l g_l) \right)$$

$$= q_j^l \delta_i^k f_k g_l + q_j^l \delta_i^k g_k f_l + q_i^k \delta_j^l f_k g_l + q_i^k \delta_j^l g_k f_l$$
$$+ q_i^k \delta_i^l \delta_j^k f_k g_l + q_i^k \delta_i^l \delta_j^k g_k f_l + q_i^l \delta_i^k \delta_j^l f_k g_l + q_i^l \delta_i^k \delta_j^l g_k f_l$$
$$+ \frac{2}{n-2}(q_j^l \delta_i^k f_k g_k + q_j^l \delta_i^k g_l f_l + q_i^k \delta_j^l f_k g_k + q_i^k \delta_j^l g_l f_l$$
$$+ q_i^k \delta_i^l \delta_j^k f_k g_k + q_i^k \delta_i^l \delta_j^k g_l f_l + q_i^l \delta_i^k \delta_j^l f_k g_k + q_i^l \delta_i^k \delta_j^l g_l f_l +)$$
$$= q_j^l f_i g_l + q_j^l g_i f_l + q_i^k f_k g_j + q_i^k g_k f_j$$
$$+ q_i^j f_j g_i + q_i^j g_j f_i + q_i^j f_i g_j + q_i^j g_i f_j$$
$$+ \frac{2}{n-2}(q_j^l \delta_i^k f_k g_k + q_j^l \delta_i^k g_l f_l + q_i^k \delta_j^l f_k g_k + q_i^k \delta_j^l g_l f_l$$
$$+ q_i^k \delta_i^l \delta_j^k f_k g_k + q_i^k \delta_i^l \delta_j^k g_l f_l + q_i^l \delta_i^k \delta_j^l f_k g_k + q_i^k \delta_i^l \delta_j^l g_l f_l +)$$