

$$\sigma'_{\lambda'}(V(\mathcal{P}_a^{L+1})) = \sigma_s(V(\mathcal{P}_a^{L+1} \setminus \{v_a^{L+1}\})) = V(K_a^{L+1}), \sigma'_{\lambda'}(V(\mathcal{P}_a^{L+2} \setminus \{v_a^{L+1}\})) = \sigma_s(V(\mathcal{P}_a^{L+1})) = V(K_a^{L+1}).$$