$$\boxed{d^3 K_p(v)[h_1,h_2,h_3]} = \frac{d}{dt}\, d^2 K_p(v+th_3)[h_1,h_2]\,\Big|_{t=0} =$$

$$\frac{d}{dt} \langle h_1, {}^{m}\cup^{p}_{e_p(v+th_3)}\, {}^{e}\cup^{e_p(v+th_3)}_{p} h_2 \rangle_p \,\Big|_{t=0} =$$

$$\langle h_1, \frac{d}{dt}\, \frac{e_p(v+th_3)}{p} (h_2 - \mathbb{E}_{e_p(v+th_3)}(h_2))\,\Big|_{t=0} \rangle_p =$$

$$\left.\begin{aligned} &\langle h_1, \frac{e_p(v)}{p} (h_3 - E_{e_p(v)}(h_3))(h_2 - E_{e_p(v)}(h_2)) \rangle_p - \\ &\langle h_1, \frac{e_p(v)}{p} \operatorname{Cov}_{e_p(v)}(h_2,h_3) \rangle_p \end{aligned}\right\} =$$

$$\langle h_1 - E_{e_p(v)}(h_1), (h_2 - E_{e_p(v)}(h_2))(h_3 - E_{e_p(v)}(h_3)) - E_{e_p(v)}((h_2 - E_{e_p(v)}(h_2))(h_3 - E_{e_p(v)}(h_3))) \rangle_{e_p v}$$

$$= \operatorname{Cov}_{e_p(v)}(h_1, (h_2 - E_{e_p(v)}(h_2))(h_3 - E_{e_p v}(h_3)))$$

$$= \underline{\boxed{E_{e_p(v)}((h_1 - E_{e_p(v)}(h_1))(h_2 - E_{e_p(v)}(h_2))(h_3 - E_{e_p(v)}(h_3)))}}$$