5.1) $G_{\mu\nu\lambda\sigma}(k) = \sum_\alpha \varepsilon^{(\alpha)}_{\mu\nu}(k)\,\varepsilon^{(\alpha)}_{\lambda\sigma}(k)$

$= A\,G_{\mu\nu}G_{\lambda\sigma} + B(G_{\mu\lambda}G_{\nu\sigma} + G_{\mu\sigma}G_{\nu\lambda}) + C(G_{\mu\nu}k_\lambda k_\sigma + k_\mu k_\nu G_{\lambda\sigma})$

$+ D(k_\mu k_\lambda G_{\nu\sigma} + k_\mu k_\sigma G_{\nu\lambda} + k_\lambda k_\nu G_{\mu\sigma} + k_\sigma k_\nu G_{\mu\lambda}) + E\,k_\mu k_\nu k_\lambda k_\sigma$

(i) $k^\mu G_{\mu\nu\lambda\sigma} = 0$

(ii) $g^{\mu\nu} G_{\mu\nu\lambda\sigma} = 0$

$k^\mu G_{\mu\nu} = k^\mu\left(g_{\mu\nu} - \frac{1}{m^2}k_\mu k_\nu\right) = k_\nu - \frac{m^2}{m^2}k_\nu = 0$

$g^{\mu\nu}G_{\mu\nu} = g^{\mu\nu}\left(g_{\mu\nu} - \frac{1}{m^2}k_\mu k_\nu\right) = \delta^\mu_\mu - \frac{m^2}{m^2} = n-1$, n : dimension

$k^\mu G_{\mu\nu\lambda\sigma} = C(m^2 k_\nu G_{\lambda\sigma}) + D(m^2 k_\lambda G_{\nu\sigma} + m^2 k_\sigma G_{\nu\lambda}) + E(m^2 k_\nu k_\lambda k_\sigma) = 0$

$C = D = E = 0$

$G_{\mu\nu\lambda\sigma}(k) = A\,G_{\mu\nu}G_{\lambda\sigma} + B(G_{\mu\lambda}G_{\nu\sigma} + G_{\mu\sigma}G_{\nu\lambda})$

$g^{\mu\nu}G_{\mu\nu\lambda\sigma} = A(n-1)G_{\lambda\sigma} + B(g^{\mu\nu}G_{\mu\lambda}G_{\nu\sigma} + g^{\mu\nu}G_{\mu\sigma}G_{\nu\lambda})$

$= A(n-1)G_{\lambda\sigma} + B\left[g^{\mu\nu}\left(g_{\mu\lambda} - \frac{1}{m^2}k_\mu k_\lambda\right)G_{\nu\sigma} + g^{\mu\nu}\left(g_{\mu\sigma} - \frac{1}{m^2}k_\mu k_\sigma\right)G_{\nu\lambda}\right]$

$= A(n-1)G_{\lambda\sigma} + B\left[\left(\delta^\nu_\lambda - \frac{1}{m^2}k^\nu k_\lambda\right)G_{\nu\sigma} + \left(\delta^\nu_\sigma - \frac{1}{m^2}k^\nu k_\sigma\right)G_{\nu\lambda}\right]$

$= A(n-1)G_{\lambda\sigma} + B\left(G_{\lambda\sigma} - \frac{1}{m^2}k^\nu k_\lambda G_{\nu\sigma} + G_{\lambda\sigma} - \frac{1}{m^2}k^\nu k_\sigma G_{\nu\lambda}\right)$

$g^{\mu\nu}G_{\mu\nu\lambda\sigma} = [A(n-1) + 2B]\,G_{\lambda\sigma} = 0$

$n = 4$, $A = -\frac{2}{3}B$

$G_{\mu\nu\lambda\sigma}(k) = B\left[G_{\mu\lambda}G_{\nu\sigma} + G_{\mu\sigma}G_{\nu\lambda} - \frac{2}{3}G_{\mu\nu}G_{\lambda\sigma}\right]$

$G_{\mu\nu}{}^{\mu\nu} = \sum_{\alpha=-2}^{2}\varepsilon^{(\alpha)}_{\mu\nu}\varepsilon^{\mu\nu}_{(\alpha)} = \delta^\alpha_\alpha = 5$

$G_{\mu\nu}{}^{\mu\nu} = g^{\mu\lambda}g^{\nu\sigma}G_{\mu\nu\lambda\sigma}$

$B\left[g^{\mu\lambda}g^{\nu\sigma}G_{\mu\lambda}G_{\nu\sigma} + g^{\mu\lambda}g^{\nu\sigma}G_{\mu\sigma}G_{\nu\lambda} - \frac{2}{3}g^{\mu\lambda}g^{\nu\sigma}G_{\mu\nu}G_{\lambda\sigma}\right] = 5$

$B\left[(n-1)^2 + g^{\nu\sigma}\left(\delta^\lambda_\sigma - \frac{1}{m^2}k^\lambda k_\sigma\right)G_{\nu\lambda} - \frac{2}{3}g^{\mu\lambda}\left(\delta^\sigma_\mu - \frac{1}{m^2}k^\sigma k_\mu\right)G_{\lambda\sigma}\right] = 5$

$B\left[(n-1)^2 + g^{\nu\sigma}G_{\nu\sigma} - \frac{2}{3}g^{\mu\lambda}G_{\mu\lambda}\right] = 5$

$B\left[(n-1)^2 + \frac{1}{3}(n-1)\right] = 5$

$B(9+1) = 5$

$B = \frac{1}{2}$

$$\boxed{G_{\mu\nu\lambda\sigma} = \sum_\alpha \varepsilon^{(\alpha)}_{\mu\nu}(k)\,\varepsilon^{(\alpha)}_{\lambda\sigma}(k) = \frac{1}{2}\left[(G_{\mu\lambda}G_{\nu\sigma} + G_{\mu\sigma}G_{\nu\lambda}) - \frac{2}{3}G_{\mu\nu}G_{\lambda\sigma}\right]}$$