$$C_\ell^{hh} = \frac{2}{\pi}\, b(z_1,m_1)\, b(z_2,m_2) \int dk\, k^2\, j_\ell(k\chi_1)\, j_\ell(k\chi_2)\, P^{lin}(k)$$

$$\equiv b(z_1,M_1)\, b(z_2,M_2)\, C_\ell^{lin}(\chi_1,\chi_2).$$

$$\langle \tau^2 g\rangle = \int dM_1\, n(M_1) \int dM_2\, n(M_2)\, b(z_1,M_1)\, b(z_2,M_2)\, C_{\ell''}^{lin}(z_1,z_2)$$

$$\times W_g(z_2)\, N_c(M_2)/\bar{n}_g \sqrt{\frac{2\ell''+1}{4\pi}}\, \delta_{\ell\ell'}\delta_{mm'}$$

$$\left(\frac{1-e^{x}}{x}\frac{T}{\sqrt{4\pi}}\right)^2 \sum_{\ell_1\ell_2} C_{\ell_2}^{\tau\tau,1halo}(M_1,z_1)\left[C_{\ell_1}^{EE}(z_1)+C_{\ell_1}^{BB}(z_1)\right] e_{\ell\ell_1\ell_2}\left|W_{2\ 2\ 0}^{\ell\ \ell_1\ \ell_2}\right|^2.$$

Call the last row $\equiv C^{\tau E}(M_1,z_1)$ and $g(M_2,z_2) \equiv W_g(z_2) N_c(M_2)/\bar{n}_g$

Then:

$$\langle \tau^2 g\rangle = \int d^3\chi_1 \int dM_1\, n(M_1,\chi_1)\, b(z_1,M_1)$$

$$\times \int d^3\chi_2 \int dM_2\, n(M_2,\chi_2)\, b(z_2,M_2)\, g(M_2,z_2).$$

$$\times\, \delta_{\ell\ell'}\delta_{mm'} \sqrt{\frac{2\ell''+1}{4\pi}}\, C_{\ell''}^{lin}(\chi_1,\chi_2)\, C^{\tau E}(\chi_1,M_1) \propto B_{\ell\ell'\ell''}$$

$$C^{\tau E} = \left(\frac{1-e^{x}}{x}\frac{T}{\sqrt{4\pi}}\right)^2 \sum_{\ell_1\ell_2} C_{\ell_2}^{\tau\tau,1halo}(M_1,z_1)\left[C_{\ell_1}^{EE}(z_1)+C_{\ell_1}^{BB}(z_1)\right] e_{\ell\ell_1\ell_2}\left|W_{2\ 2\ 0}^{\ell\ \ell_1\ \ell_2}\right|^2.$$

↑ is a constant, so we only need to compute $\ell=0$ which simplifies to:

$$C_{\ell=0}^{\tau E} = \left(\frac{1-e^{x}}{x}\frac{T}{\sqrt{4\pi}}\right)^2 \sum_{\ell_1\ell_2} C_{\ell_2}^{\tau\tau,1halo}(M_1,z_1)\left(C_{\ell_1}^{EE}(z_1)+C_{\ell_1}^{BB}(z_1)\right) e_{\ell\ell_1\ell_2}$$

$$\times \frac{(2\ell_1+1)(2\ell_2+1)}{4\pi}\begin{pmatrix} 0 & \ell_1 & \ell_2 \\ -2 & 2 & 0\end{pmatrix}^2$$

Triangle rule: $|\ell_1 - \ell_2| \leq 0 \leq \ell_1 + \ell_2 \Rightarrow \ell_1 = \ell_2 \equiv L$

$$C_{\ell=0}^{\tau E} = \left(\frac{1-e^x}{x}\frac{\bar{T}}{\sqrt{4\pi}}\right)^2 \sum_L C_L^{\tau\tau,\text{1halo}} \left(C_L^{EE} + C_L^{BB}\right) \frac{(2L+1)^2}{4\pi} \begin{pmatrix} 0 & L & L \\ -2 & 2 & 0 \end{pmatrix}^2$$

For $e_{\ell\ell_1\ell_2}$ if $\ell = 0$ and $\ell_1 = \ell_2$, $e_{\ell\ell_1\ell_2} = 1$ automatically

To approximate $C_\ell^{\tau B}$ however, should consider $\ell = 1$ so that $o_{\ell\ell_1\ell_2} \neq 0$.

all the time:

$$C_{\ell=1}^{\tau B} = \left(\frac{1-e^x}{x}\frac{\bar{T}}{\sqrt{4\pi}}\right)^2 \sum_{\ell_1\ell_2} C_{\ell_2}^{\tau\tau,\text{1halo}} \left(C_{\ell_1}^{EE} + C_{\ell_1}^{BB}\right) o_{1\ell_1\ell_2} \frac{(2\ell_1+1)(2\ell_2+1)}{4\pi} \begin{pmatrix} 1 & \ell_1 & \ell_2 \\ -2 & 2 & 0 \end{pmatrix}^2.$$

Triangle rule again gives:

$|\ell_1 - \ell_2| \leq 1 \leq \ell_1 + \ell_2$. if $\ell_1 = \ell_2$ this is satisfied as long as $\ell_1, \ell_2 > 0$

if $\ell_1 = \ell_2 + 1$ then $\ell + \ell_1 + \ell_2$ is even and $o \to 0$.

Then

$$C_{\ell=1}^{\tau B} = \left(\frac{1-e^x}{x}\frac{\bar{T}}{\sqrt{4\pi}}\right)^2 \sum_{L=2}^{10^4} C_L^{\tau\tau,\text{1halo}} \left(C_L^{EE} + C_L^{BB}\right) \frac{(2L+1)^2}{4\pi} \begin{pmatrix} 1 & L & L \\ -2 & 2 & 0 \end{pmatrix}^2.$$