Yoo Eqns

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The following equations are taken from Yoo et al.

$$\int \frac{d^3\mathbf{q}}{(2\pi)^3} P_m(q) P_m(|\mathbf{k}-\mathbf{q}|) F_2(\mathbf{q}, \mathbf{k}-\mathbf{q})$$

$$= \frac{k^3}{(2\pi)^2} \int_0^\infty dr\, r^2\, P_m(kr) \int_{-1}^1 d\mu\, P_m\left(k\sqrt{1+r^2-2r\mu}\right) \frac{3r+7\mu-10r\mu^2}{14r(1+r^2-2r\mu)}$$

$$\int \frac{d^3\mathbf{q}}{(2\pi)^3} P_m(q) P_m(|\mathbf{k}-\mathbf{q}|) G_u(\mathbf{q}, \mathbf{k}-\mathbf{q})$$

$$= \frac{k^3}{(2\pi)^2} \int_0^\infty dr r^2 P_m(kr) \int_{-1}^1 d\mu P_m\left(k\sqrt{1+r^2-2r\mu}\right) \frac{T_{ru}(q)}{T_m(q)} \frac{T_{ru}(k\sqrt{1+r^2-2r\mu})}{T_m(k\sqrt{1+r^2-2r\mu}))} \frac{r-\mu}{\sqrt{1+r^2-2r\mu)}}$$

$$P_g(k) = b_1^2 P_{nl}(\mathbf{k}) + \int \frac{d^3\mathbf{q}}{(2\pi)^3} P_m(q) P_m(|\mathbf{k}-\mathbf{q}|)[\frac{1}{2}b_2^2 + 2b_1 b_2 F_2(\mathbf{q}, \mathbf{k}-\mathbf{q})$$

$$+4b_1 b_r F_2(\mathbf{q}, \mathbf{k}-\mathbf{q}) G_u(\mathbf{q}, \mathbf{k}-\mathbf{q}) + 2b_2 b_r G_u(\mathbf{q}, \mathbf{k}-\mathbf{q}) + 2b_r^2 G_u(\mathbf{q}, \mathbf{k}-\mathbf{q})^2]$$

We make the coordinate transformation $r \to 1/r$, so we have

$$\int_0^\infty f(r)dr = \int_0^1 f(r)dr + \int_1^\infty f(r)dr = \int_0^1 f(r)dr + \int_0^1 r^{-2} f(1/r)dr$$

This allows us to avoid an infinite limit of integration and to use the numerical integration software Cuba. A linear matter power spectrum, represented above as P_m, was obtained from data generated from a fiducial cosmology using CAMB (Code for Anisotropies in the Microwave Background) and is shown in Figure **??**.