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Linear Bias and Growth Factor Formulae

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ABSTRACT
We present some very simple algebraic formula manipulation, that allows us to evolve the (linear) bias b, which relates galaxy and mass clustering via $\xi_{\rm galaxy} = b^2 \xi_{\rm mass}$ in the linear regime. We use this for the 2SLAQ LRG as well as the AAOmega LRG Survey.

1 METHOD

1.1 Page 1

Using **?**:

$$
\begin{aligned}
b(z) &= 1 + [b(0) - 1]\, G(\Omega_{\rm m}, \Omega_\Lambda, z) && (1)\\
\Rightarrow b(z) - 1 &= [b(0) - 1]\, G && (2)\\
&= b(0)\, G - G && (3)\\
\Rightarrow \frac{b(z) - 1}{G} &= b(0) - 1 && (4)\\
\therefore b(0) &= \frac{b(z) - 1}{G} + 1 && (5)
\end{aligned}
$$

e.g. 2SLAQ LRGs $\bar{z} = 0.55$ with $b(0.55) = 1.66$

Case 1.
$(\Omega, \Lambda)\underline{= (1, 0) \Rightarrow \text{EdS}}$, $G = 1 + z$

$$
\begin{aligned}
b(0) &= \frac{b(z) - 1}{G} + 1 && (6)\\
\Rightarrow b(0) &= \frac{1.66 - 1}{1 + 0.55} + 1 = 1.42581 && (7)
\end{aligned}
$$

Case 2.
$(\Omega, \Lambda)\underline{= (0.3, 0.7) \Rightarrow \Lambda\text{CDM}}$, $G = 1.32, [1.27], \mathbf{1.18}$

$$
\begin{aligned}
b(0) &= \frac{b(z) - 1}{G} + 1 && (8)\\
\Rightarrow b(0) &= \frac{1.66 - 1}{G} + 1 = 1.50, [1.52], \mathbf{1.56} && (9)
\end{aligned}
$$

[] values for $(\Omega, \Lambda) = (0.2, 0.8)$ and **bold** values for $(\Omega, \Lambda) = (0.1, 0.9)$.

1.2 Page 2

$$
\begin{aligned}
\xi_{\rm gg}(z = 0.55) &= 0.98\, \xi_{\rm gg}(z = 0.55) && (10)\\
\Rightarrow &= 0.98\, \xi_{\rm gg}(z = 0.55) && (11)\\
& && (12)
\end{aligned}
$$

Values of $G(\Omega_{\rm m}, \Omega_\Lambda, z)$