$$\langle x_{n+1}^2 \rangle = \alpha^2 \langle x_n^2 \rangle + 2\alpha \langle x_n \rangle \langle r \rangle + \langle r^2 \rangle \quad (6)$$

c) $A\lambda^{n+1} + B = \alpha(A\lambda^n + B) + \frac{1}{2}$ (1)

when $n=0$

$A\lambda + B = \alpha(A+B) + \frac{1}{2}$ (2)

(1) − (2)

$\lambda^n A(\lambda - 1) = \alpha\lambda^n(\lambda - 1)$

$A = \alpha$

sub into (2)

$\alpha\lambda + B = \alpha^2 + \alpha B + \frac{1}{2}$

$B(1-\alpha) = \alpha(\alpha - \lambda) + \frac{1}{2}$

$B = \frac{\alpha(\alpha - \lambda)}{1-\alpha} + \frac{1}{2(1-\alpha)}$

$x_n = A\lambda^n + B$

$= \alpha$

$A\lambda(\lambda^n - 1) = \alpha A(\lambda^n - 1)$

$\lambda = \alpha$

then from (2)

$A\alpha + B = \alpha B + \frac{1}{2}$

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

$B = \frac{1}{2(1-\alpha)}$