$$P - E(X) - \frac{1}{2B} E\left[P^2 - 2PX + X^2\right] = 0$$

$$2B\left[P - E(X)\right] - \left[P^2 + E(X^2) - 2PE(X)\right] = 0$$

$$-P^2 + P\left[2B + 2E(X)\right] - 2BE(X) - E(X^2) = 0$$

$$P^2 - 2P\left[B + E(X)\right] + 2BE(X) + E(X^2) = 0$$

$$P = \frac{2\left[B + E(X)\right] \pm \sqrt{4\left[B + E(X)\right]^2 - 4\left[2BE(X) + E(X^2)\right]}}{2}$$

$$P = B + E(X) \pm \sqrt{B^2 + 2BE(X) + E^2(X) - 2BE(X) - E(X^2)}$$

$$P = B + E(X) \pm \sqrt{B^2 - \mathrm{var}(X)} \; ; \quad P = B + E(X) - \sqrt{B^2 - \mathrm{var}(X)}$$

$$P = E(X) + B - \sqrt{B^2 - B^2 \frac{\mathrm{var}(X)}{B^2}} = E(X) + B - \sqrt{B^2\left(1 - \frac{\mathrm{var}(X)}{B^2}\right)}$$

$$P = E(X) + B\left[1 - \sqrt{1 - \frac{\mathrm{var}(X)}{B^2}}\right]$$

RICORDIAMO LO SVILUPPO IN SERIE DI $(1+x)^\alpha$

$$(1+x)^\alpha = 1 + \alpha x + \frac{\alpha(\alpha-1)}{2}x^2 + \dots \frac{\alpha(\alpha-1)\dots(\alpha-n+1)}{n!}x^n + o(x^n)$$

$$(1-x)^{1/2} = 1 - \frac{1}{2}x - \frac{1}{8}x^2 + o(x^2)$$

$$P = E(X) + B\left[1 - 1 + \frac{1}{2}\frac{\mathrm{var}(X)}{B^2} + \frac{1}{8}\frac{\mathrm{var}^2(X)}{B^4} + o\left(\frac{\mathrm{var}^2(X)}{B^4}\right)\right]$$