Contents

1   target function approximation

excluding use of floats, and division, only +,-,* are allowed.

2   target function emulation

2.1   target function

- target fuction T:

$$T = L * \phi(\sigma) = L * (1 - (1 - f)^{\sigma})$$

- σ is relative stake.
- f is tuning parameter, or the probability of winning have all the stake
- L is field length

2.2 $\phi(\sigma)$ approximation

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$$\phi(\sigma) = 1 - (1 - f)^{\sigma}$$

-

$$= 1 - e^{\sigma ln(1-f)}$$

-

$$= 1 - (1 + \sum_{n=1}^{\infty} \frac{(\sigma ln(1-f))^n}{n!})$$

-

$$\sigma = \frac{s}{\Sigma}$$

- s is stake, and Σ is total stake.

2.3   target T n term approximation

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$$k = L ln(1-f)^1$$

-

$$k'^n = L ln(1-f)^n$$

-

$$T = -[k\sigma + \frac{k''}{2!}\sigma^2 + \cdots + \frac{k'^n}{n!}\sigma^n]$$

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$$= -[\frac{k}{\Sigma}s + \frac{k''}{\Sigma^2 2!}s^2 + \cdots + \frac{k'^n}{\Sigma^n n!}s^n]$$
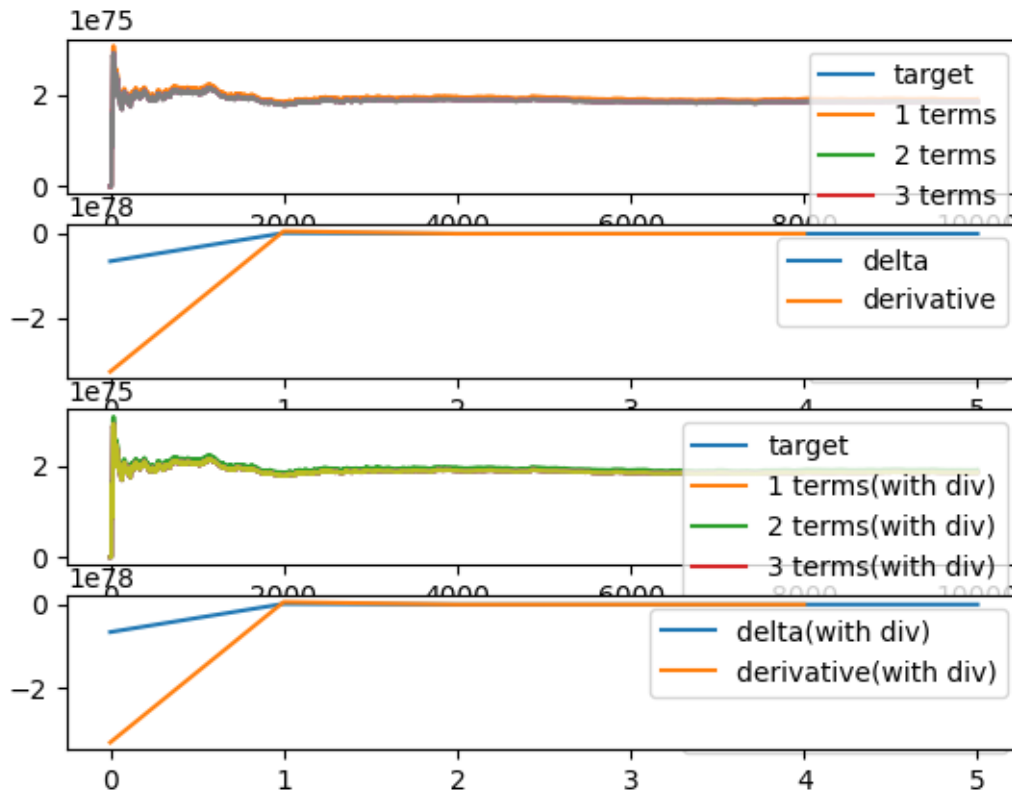
3 comparison of original target to approximation

Figure 1: alt text

4 consequences

- hard coded tunning.
- public reward function.

5 conclusion

as the derivative of deltas graph shows, starting for term 2, the derivatives is ~ 0, and it's the optimal number of terms in approximation accuracy that has the least number of terms.