

Then 2nd term in (1) becomes -

$$= C [1 + r + r^2 + \dots + r^k]$$

$$= C \left[\frac{1 - r^{k+1}}{1 - r} \right]$$

if k is smaller then this term will be smaller.
and if larger then this term will be larger.

If the episode length is determined by the actions
(~~think of~~ like in a board game then for positive C
& longer games might be the case. (For diff episodes with
different length, this value will be different))