The toilet roll trading agent can implement its transaction by calculating the average price of toilet rolls in this way:

\[ \text{new} = \text{ave} + \frac{\text{new-old}}{20} \]

where \( \text{new} \) is the current price of toilet rolls and \( \text{old} \) is the price of toilet rolls 20 time units ago.
Say that \( p_{-i} \) is the price \( i \) units ago.

So,

\[
\overbrace{\frac{p_{-20} + p_{-19} + \cdots + p_{-1}}{20}} + \overbrace{\frac{p_0 - p_{-20}}{20}} =
\]

\[
\overbrace{\frac{p_{-19} + p_{-18} + \cdots + p_{-1} + p_0}{20}}
\]

(\( \text{current average} \))

*requires maintaining 20 prices in the belief state, i.e., the agent needs to remember a lot of prices.*
So, if the agent to save memory (size of belief space), it could approximate with:

$$\text{ave} = \text{ave} + \frac{\text{new-ave}}{20},$$

which requires passing in belief space only one number (ave).