So, for a.a $\omega \in \Omega$.

$$\mu_{R(\omega)}\left(f(\tilde{G}_N)\right) \xrightarrow[\text{as } N\to\infty]{} \mu_{R(\omega)}\left(f(\tilde{G})\right)$$

$$\mathbb{E}[f(\tilde{G}) \mid R(\omega)] = \mathbb{E}[f(\tilde{G}_N) \mid R](\omega).$$

i.e. $$\mathbb{E}[f(\tilde{G}_N) \mid R] \xrightarrow{a.s.} \mathbb{E}[f(\tilde{G}) \mid R]$$

f is bounded above so