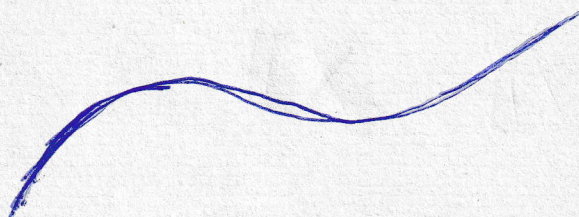instead of $L_n(w)$ could use ~~$\sup R_n(w)$~~

$$\sup_{s,t} \frac{R_s R_n(s,w) - R_n(t,w)}{|s-t|}$$

→ okay even in that case