$$|Y-Z|_t \leq |Y|_t + |Z|_t.$$

Where for $0 = t_1 \leq \ldots \leq t_n = t$

$$|Y|_t = \sum_{i=1}^{n} |Y_{t_i} - Y_{t_{i-1}}|.$$

Lets say we can use the limit structure already

$$\begin{aligned}
|Y|_t &= \lim_{n\to\infty} \sum_{i=1}^{n} |Y_{t_i} - Y_{t_{i-1}}| = \lim_{n\to\infty} \sum_{i=1}^{n} \lim_{m\to\infty} \sum_{J\in\Pi_m} (\Delta_{J\cap[0,t_i]}X)^2 - \lim_{m\to\infty} \sum_{J\in\Pi_m} (\Delta_{J\cap[0,t_{i-1}]}X)^2 \\
&\leq \lim_{n\to\infty} \sum_{i=1}^{n} \lim_{m\to\infty} \sum_{J\in\Pi_m} (\Delta_{J\cap[0,t_i]}X)^2 \\
&= \lim_{n\to\infty} \lim_{m\to\infty} \sum_{i=1}^{n} \sum_{J\in\Pi_m} (\Delta_{J\cap[0,t_i]}X)^2
\end{aligned}$$

.

bzw.

$$\begin{aligned}
|Y|_t = \lim_{n\to\infty} \sum_{i=1}^{n} |Y_{t_i} - Y_{t_{i-1}}| &= \lim_{n\to\infty} \sum_{i=1}^{n} |\langle X\rangle_{t_i} - \langle X\rangle_{t_{i-1}}| \\
&\overset{\text{(i)}}{\leq} \lim_{n\to\infty} \sum_{i=1}^{n} |\langle X\rangle_{t_i}| \\
&= \sum_{i=1}^{k} \langle X\rangle_{t_i} + \lim_{n\to\infty} \sum_{k=1}^{n} \langle X\rangle_{t_i} \\
&= Y_t + 0.
\end{aligned}$$

If we know

$$\sum_{i=1}^{\infty} a_i < \infty.$$

Then

$$\lim_{k\to\infty} \sum_{i=k}^{\infty} a_i \to 0.$$