

$$\begin{aligned}
-1 &\leq (-1)^n \leq 1 \\
-1 + n &\leq (-1)^n + n \leq 1 + n \\
-1 + 2 &\leq (-1)^n + 2 \leq 1 + 2 \\
\frac{1}{3} &\leq \frac{1}{(-1)^n + 2} \leq 1 \\
\frac{n-1}{3} &\leq \frac{(-1)^n + n}{(-1)^n + 2} \leq 1 + n
\end{aligned}$$