1.5

⊗ $V_n = (-1)^n (u_n + u_{n+1})$ (Rem : $(-1)^n = 1/(-1)^n$)

$$\sum_{p=0}^{n} V_p = \sum_{p=0}^{n} (-1)^p u_p + (-1)^p u_{p+1})$$

$$= \sum_{p=0}^{n} (-1)^p u_p + \sum_{p=0}^{n} (-1)^p u_{p+1}$$

$$= \sum_{p=0}^{n} (-1)^p u_p - \sum_{p=0}^{n} (-1)^{p+1} u_{p+1}$$

$$= \sum_{p=0}^{n} (-1)^p u_p - \sum_{p=1}^{n+1} (-1)^p u_p$$

(On isole $p=0$ dans la 1ere et $p=n+1$ dans la 2nd-)

$$\boxed{\sum_{p=0}^{n} V_p = u_0 - (-1)^{n+1} u_{n+1} \cancel{-u_0}}$$

4) $$\sum_{0}^{\infty} V_n = \lim_{n\to\infty} \Big(-(-1)^{n+1} \underbrace{u_{n+1}}_{\to 0 \ \text{q2}} + u_0 \Big) = + u_0 = \int_0^1 \frac{dx}{1+x^2}$$

$$= \text{Arctan}(1)$$

$$\boxed{\sum_{n=0}^{\infty} V_n = \text{Arctan}(1) = \frac{\pi}{4}}$$