MATH 4998 Fall 2018

$\mathbb{T} = \mathbb{Z}$

① $\sigma(t) = t+1$

$\mu(t) = 1$

② $f^{\Delta}(t) = \dfrac{f(\sigma(t)) - f(t)}{\mu(t)}$

$= f(t+1) - f(t)$

③ $f^{\Delta}(t) = \dfrac{[(t+1)^2 + 2(t+1)] - (t^2+2t)}{1}$

$= t^2+2t+1+2t+2-t^2-2t$

$= 2t+3$

④ $\displaystyle\int_0^3 f(t)\,\Delta t = \sum_{k=0}^{3-1} f(k)\mu(k)$

$= f(0)+f(1)+f(2)$

$= 0+3+8$

$= 11$

$\mathbb{T} = 2^{\mathbb{N}_0} = \{1, 2, 4, \dots\}$

① $\sigma(t) = 2t$

$\mu(t) = t$

② $f^{\Delta}(t) = \dfrac{f(\sigma(t)) - f(t)}{\mu(t)}$

$= \dfrac{f(2t) - f(t)}{t}$

③ $f^{\Delta}(t) = \dfrac{[(2t)^2 + 2(2t)] - [t^2+2t]}{t}$

$= \dfrac{4t^2+4t-t^2-2t}{t}$

$= \dfrac{3t^2+2t}{t} = 3t+2$

④ $\displaystyle\int_1^8 f(t)\,\Delta t = \mu(1)f(1) + \mu(2)f(2) + \mu(4)f(4)$

$= (1)(3) + 2(8) + 4(24)$

$= 115$

$\mathbb{T} = \sqrt{\mathbb{N}} = \{0, 1, \sqrt{2}, \sqrt{3}, \dots\}$

① $\sigma(t) = \sqrt{t^2+1}$

$\mu(t) = \sqrt{t^2+1} - t$

② $f^{\Delta}(t) = \dfrac{f(\sqrt{t^2+1}) - f(t)}{\sqrt{t^2+1} - t}$

③ $f^{\Delta}(t) = \dfrac{[(\sqrt{t^2+1})^2 + 2\sqrt{t^2+1}] - (t^2+2t)}{\sqrt{t^2+1} - t}$

$= \dfrac{2\sqrt{t^2+1} + 1 - 2t}{\sqrt{t^2+t} - t}$

④ $\displaystyle\int_0^{\sqrt{3}} f(t)\,\Delta t = f(0)\mu(0) + f(1)\mu(1) + f(\sqrt{2})\mu(\sqrt{2})$

$= 0 + 3(\sqrt{2}-1) + (2+2\sqrt{2})(\sqrt{3}-\sqrt{2})$

$= 3\sqrt{2} - 3 + 2\sqrt{3} - 2\sqrt{2} + 2\sqrt{6} - 4$

$= -7 + \sqrt{2} + 2\sqrt{3} + 2\sqrt{6}$