2015　解析学試験問題 略解

Basic 問題

[**1**] $\dfrac{dy}{dx} = \{(1+\log x)\log(\cosh x) + \tanh x\} x^x (\cosh x)^{x^x}$

[**2**] $\dfrac{\sqrt{3}}{3}\pi - \dfrac{1}{2} + \dfrac{1}{3}\log 2$

[**3**] $\displaystyle\int_0^1 \frac{4(1+5t)}{(3-t)(1+t)(1+t^2)}\,dt$

[**4**] -2π

[**5**] (a) $f(x) = \dfrac{-1}{x+3} + \dfrac{x}{x^2+2x+5} + \dfrac{5}{(x^2+2x+5)^2}$

(b) $-\dfrac{1}{2}\log 2 - \dfrac{3}{64}\pi + \dfrac{5}{32}$

Advanced 問題

[**1**] $f(x) = 1 - 2x^2 \quad (-1 \le x \le 1)$

[**2**] $f_{xy} = 4xy^3 h(xy^2) + 2x^2y^5 h'(xy^2) + 2h(2x-y) + 2(2x-y)h'(2x-y)$

[**3**] $(z_x)^2 + (z_y)^2 = (z_r)^2 + \dfrac{1}{r^2}(z_\theta)^2$

[**4**] 0