

数学演習 B.5.1

額田達也

$$|a+b|^2 = (a+b, a+b) = (a, a+b) + (b, a+b) = (a, a) + (a, b) + (b, a) + (b, b) = |a|^2 + 2(a, b) + |b|^2$$

b を $-b$ に置き換えると

$$|a-b|^2 = |a|^2 + 2(a, -b) + |-b|^2 = |a|^2 - 2(a, b) + |b|^2$$

$$\text{辺々を足して } |a+b|^2 + |a-b|^2 = |a|^2 - 2(a, b) + |b|^2 + |a|^2 + 2(a, b) + |b|^2$$

$$\text{整理して } |a+b|^2 + |a-b|^2 = 2(|a|^2 + |b|^2)$$