Lecture 18 Part II : Lecture 10, P.S.

Similar to (12) & (13) in Lec 10 :

$$\sinh(z_1+z_2) \overset{(10)\text{Lec10}}{=} i\sin(iz_1+iz_2)$$

$$= -i\sin iz_1 \cos iz_2 - i\cos iz_1 \sin iz_2$$

$$\overset{(10),(11)\text{Lec10}}{=} \sinh z_1 \cosh z_2 + \cosh z_1 \sinh z_2 \quad (A)$$

& similarly ★

$$\cosh(z_1+z_2) = \cosh z_1 \cosh z_2 + \sinh z_1 \sinh z_2 \quad (B)$$

taking $z_1 = x$, $z_2 = iy$ leads to

$$\sinh(x+iy) = \sinh x \cosh iy + \cosh x \sinh iy$$

$$\overset{(10)(11)\text{Lec10}}{=} \sinh x \cos y + \cosh x \cdot -i\sin(-y)$$

$$= \sinh x \cos y + i\cosh x \sin y \quad (C)$$

similarly ★

$$\cosh(x+iy) = \cosh x \cos y + i\sinh x \sin y \quad (D).$$