

## 自習題 6

$$\frac{1-d^2}{1-2d\cos x+d^2} = \frac{\boxed{\phantom{1-d^2}}}{1-de^{ix}} + \frac{\boxed{\phantom{1-d^2}}}{1-de^{-ix}}$$

$$= 1 + \sum_{n=1}^{\infty} d^n e^{inx} + \sum_{n=1}^{\infty} d^n e^{-inx}$$

$$= 1 + \sum_{n=1}^{\infty} d^n (e^{inx} + e^{-inx})$$

$$= 1 + \sum_{n=1}^{\infty} d^n \cdot \boxed{2} \cos nx$$

$$\frac{1}{\pi} \int_{-\pi}^{\pi} \frac{1-d^2}{1-2d\cos x+d^2} \cos nx \, dx = \boxed{2\pi}$$

$$\therefore \frac{\boxed{\pi^2}}{(1-d^2)} = \int_0^{\pi} \frac{\cos nx}{1-2d\cos x+d^2} \, dx$$