Formulas for final exam

$$\begin{aligned}\frac{1}{2\pi}\int_{-\pi}^{\pi}|f(x)|^2\,dx &= \sum_{k=-\infty}^{\infty}|c_k|^2 \\ &= |a_0|^2 + \frac{1}{2}\sum_{k=1}^{\infty}|a_k|^2 + |b_k|^2\end{aligned}$$

Common inequalities

$$\begin{aligned}P(X \geq a) &\leq E[X]/a \qquad (X > 0) \\ P(|X - \mu| &\geq a\sigma) \leq 1/a^2\end{aligned}$$

Common probability distributions

$$\begin{aligned}f_X(x) &= \begin{cases}\lambda e^{-\lambda x} & \text{if } x > 0 \\ 0 & \text{else}\end{cases} \\ f_X(x) &= \frac{1}{\sqrt{2\pi}\sigma}e^{-\frac{1}{2}(x-\mu)^2/\sigma^2} \\ p_X(k) &= \begin{cases}\binom{n}{k}p^k(1-p)^{n-k} & \text{if } k = 0, 1, \ldots, n \\ 0 & \text{else}\end{cases} \\ p_X(k) &= \begin{cases}e^{-\lambda}\lambda^k/k! & \text{if } k = 0, 1, 2, \ldots \\ 0 & \text{else}\end{cases}\end{aligned}$$