University of Colorado
Department of Mathematics

2015/2016 Semester | Math 6320 Real Analysis 1 | Assignment 2

Due Monday, February 15, 2016

1. (a) Show that the space $\mathbf{c}$ of all convergent sequences of complex numbers is a Banach space, where we define

$$\{c_n\}_{n=1}^{\infty} + \{d_n\}_{n=1}^{\infty} = \{c_n + d_n\}_{n=1}^{\infty} \in \mathbf{c},$$

$$\alpha \cdot \{c_n\}_{n=1}^{\infty} \text{ for } = \{\alpha \cdot c_n\}_{n=1}^{\infty} \in \mathbf{c}, \text{ for } \alpha \in \mathbb{C},$$

$$\|\{c_n\}_{n=1}^{\infty}\| = \sup_{n\in\mathbb{N}}\{|c_n\|\}.$$

   (b) Show that the subspace $\mathbf{c}_0$ of $\mathbf{c}$, consisting of all complex sequences that converge to 0 is also a Banach space (the norm begin the same as the norm defined for $\mathbf{c}$ in part (a) above.)

2. Do the following problems in the Folland textbook: pp. 154–156: # 2, 4, 7 (a), (b), 12 (a), (b), (c), (d); p. 164 # 27, 29 (a), (b).