1.4. Passage from Finite- to Infinite-Dimensional Spaces

Note. Crudely put, whenever we pass from the finite to the infinite, we worry about divergence. For example, a finite sum is simply a finite sum (of numbers, matrices, group elements, etc.). However, an infinite sum may converge to some number (or matrix, or group element), or fail to converge (i.e., diverge). To discuss convergence or divergence, we must have a way to discuss limits, and hence we must have a way to measure distances (i.e., we need a metric. . . or at least a topology).

Note. We will make the "passage" to infinite-dimensional normed spaces basically by replacing the idea of a finite linear combination with an infinite linear combination and by excluding all vectors of infinite length. We start this in Chapter 2.

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