

VI. A MORE GENERAL SOLUTION: SVD

This section is the most mathematically involved and can be skipped without much loss of continuity. It is presented solely for completeness. We derive another algebraic solution for *PCA* and in the process, find that *PCA* is closely related to singular value decomposition (*SVD*). In fact, the two are so intimately related that the names are often used interchangeably. What we will see though is that *SVD* is a more general method of understanding *change of basis*.

We begin by quickly deriving the decomposition. In the following section we interpret the decomposition and in the last section we relate these results to *PCA*.