CUNY IS 622

Ben Arancibia

December 12, 2015

11.4.1

The SVD for the matrix

$$M = \begin{bmatrix} 48 & 14 \\ 14 & -48 \end{bmatrix}$$

is

$$\begin{bmatrix} 48 & 14 \\ 14 & -48 \end{bmatrix} = \begin{bmatrix} 3/5 & 4/5 \\ 4/5 & -3/5 \end{bmatrix} \begin{bmatrix} 50 & 0 \\ 0 & 25 \end{bmatrix} \begin{bmatrix} 4/5 & -3/5 \\ 3/5 & 4/5 \end{bmatrix}$$

Find the Moore-Penrose pseudoinverse of M.

```
library(matrixkit)
M <- matrix(c(48, 14, 14, -48), ncol=2, byrow=TRUE)


pseudoinverse <- function(x, tol)
{
  SVD = smart_svd(x, tol)

  if (length(SVD$d) == 0) {
    return(array(0, dim(x)[2:1]))
  } else {
    return(SVD$v %*% (1/SVD$d * t(SVD$u)))
  }
}

pseudoinverse(M)
```

```
##         [,1]    [,2]
## [1,] 0.0192  0.0056
## [2,] 0.0056 -0.0192
```