MP Fail

Here we provide an example that show the MP gives estimate not exaxctly result.

Consider a C matrix with condition number $\kappa(C) = 4 \times 10^8$ where

$$\mathbf{C} = \begin{bmatrix} 2 & 2 - 10^{-8} \\ 2 - 10^{-8} & 2 \end{bmatrix}$$

and $\mathbf{Y} = (1, 2)^t$, then the MP pseudoinverse by R package: `ginv`, yields $\mathbf{C}_2^{-1}\mathbf{Y} = (0.375, 0.375)^t \equiv b$. However, direct algebraic computation shows that $\mathbf{Y} = \mathbf{C}b = (1.5, 1.5)^t$ which does not recover $\mathbf{Y} = (1, 2)^t$.

```
library(MASS)
eps<-10^(-8)
C<-matrix(c(2,2-eps,2-eps,2),ncol=2)
kappa(C)
```

```
## [1] 4e+08
```

```
Y.true<-matrix(c(1,2),ncol=1)
b<-ginv(C)%*%Y.true
b
```

```
##       [,1]
## [1,] 0.375
## [2,] 0.375
```

```
Y.sol <- C%*%b
Y.true
```

```
##      [,1]
## [1,]    1
## [2,]    2
```

```
Y.sol
```

```
##      [,1]
## [1,]  1.5
## [2,]  1.5
```