UJIAN TENGAH SEMESTER I

SK5001 Analisis Numerik Lanjut

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Beberapa Function yang Berguna

```r
# membuat matrix n x n secara random
bikin_matrix = function(n){
  # membuat matrix random n x n
  v = sample(0:9,n^2,replace = T)
  A = matrix(v,byrow = T,ncol = n)
  return(A)
}

# misal matriks A n x n
n = 3
A = bikin_matrix(n)

# menghitung inverse
solve(A)
```

```
##            [,1]        [,2]        [,3]
## [1,] -0.1071429  0.09523810  0.03571429
## [2,] -0.1428571 -0.09523810  0.21428571
## [3,]  0.3214286  0.04761905 -0.10714286
```

```r
# pembuktian A * A^(-1) = I
A %*% solve(A)
```

```
##               [,1]         [,2]          [,3]
## [1,]  1.000000e+00 0.000000e+00  5.551115e-17
## [2,]  0.000000e+00 1.000000e+00 -1.387779e-17
## [3,] -2.220446e-16 5.551115e-17  1.000000e+00
```

```r
# menghitung determinan
det(A)
```

```
## [1] 168
```

```r
# mencari nilai eigen
eigen(A)
```

```
## eigen() decomposition
## $values
## [1] 10.486495+0.000000i -3.243248+2.345623i -3.243248-2.345623i
##
## $vectors
```

```
##                   [,1]                     [,2]                     [,3]
## [1,] 0.3875259+0i -0.1205807+0.3041806i -0.1205807-0.3041806i
## [2,] 0.5452448+0i  0.7612467+0.0000000i  0.7612467+0.0000000i
## [3,] 0.7433248+0i -0.4612284-0.3173425i -0.4612284+0.3173425i
```

```r
# melakukan transpose
t(A)
```

```
##      [,1] [,2] [,3]
## [1,]    0    9    4
## [2,]    2    0    6
## [3,]    4    3    4
```

```r
# menghitung norm infinity
norm(A,"I")
```

```
## [1] 14
```

```r
# mengalikan matriks dengan vector
# misal
b = sample(0:9,n,replace = T)
A %*% b
```

```
##      [,1]
## [1,]   20
## [2,]   93
## [3,]   64
```

```r
# mengekstrak diagonal dari matrix
diag(A)
```

```
## [1] 0 0 4
```

```r
# membuat matriks diagonal n x n dari berisi bilangan tertentu
x = sample(0:9,n,replace = T)
diag(x)
```

```
##      [,1] [,2] [,3]
## [1,]    6    0    0
## [2,]    0    4    0
## [3,]    0    0    1
```

```r
# membuat matriks identitas n x n
diag(1,n)
```

```
##      [,1] [,2] [,3]
## [1,]    1    0    0
## [2,]    0    1    0
## [3,]    0    0    1
```