

# Matrix Operations & Vizualizing with Matplot

Pinak Nayak

## *#Seasons*

Seasons <-

```
c("2005", "2006", "2007", "2008", "2009", "2010", "2011", "2012", "2013", "2014")
```

## *#Players*

Players <-

```
c("KobeBryant", "JoeJohnson", "LeBronJames", "CarmeloAnthony", "DwightHoward", "ChrisBosh", "ChrisPaul", "KevinDurant", "DerrickRose", "DwayneWade")
```

## *#Salaries*

KobeBryant\_Salary <-

```
c(15946875, 17718750, 19490625, 21262500, 23034375, 24806250, 25244493, 27849149, 30453805, 23500000)
```

JoeJohnson\_Salary <-

```
c(12000000, 12744189, 13488377, 14232567, 14976754, 16324500, 18038573, 19752645, 21466718, 23180790)
```

LeBronJames\_Salary <-

```
c(4621800, 5828090, 13041250, 14410581, 15779912, 14500000, 16022500, 17545000, 19067500, 20644400)
```

CarmeloAnthony\_Salary <-

```
c(3713640, 4694041, 13041250, 14410581, 15779912, 17149243, 18518574, 19450000, 22407474, 22458000)
```

DwightHoward\_Salary <-

```
c(4493160, 4806720, 6061274, 13758000, 15202590, 16647180, 18091770, 19536360, 20513178, 21436271)
```

ChrisBosh\_Salary <-

```
c(3348000, 4235220, 12455000, 14410581, 15779912, 14500000, 16022500, 17545000, 19067500, 20644400)
```

ChrisPaul\_Salary <-

```
c(3144240, 3380160, 3615960, 4574189, 13520500, 14940153, 16359805, 17779458, 18668431, 20068563)
```

KevinDurant\_Salary <-

```
c(0, 0, 4171200, 4484040, 4796880, 6053663, 15506632, 16669630, 17832627, 18995624)
```

DerrickRose\_Salary <-

```
c(0, 0, 0, 4822800, 5184480, 5546160, 6993708, 16402500, 17632688, 18862875)
```

```

DwayneWade_Salary <-
c(3031920,3841443,13041250,14410581,15779912,14200000,15691000,1718200
0,18673000,15000000)
#Matrix
Salary <- rbind(KobeBryant_Salary, JoeJohnson_Salary,
LeBronJames_Salary, CarmeloAnthony_Salary, DwightHoward_Salary,
ChrisBosh_Salary, ChrisPaul_Salary, KevinDurant_Salary,
DerrickRose_Salary, DwayneWade_Salary)
rm(KobeBryant_Salary, JoeJohnson_Salary, CarmeloAnthony_Salary,
DwightHoward_Salary, ChrisBosh_Salary, LeBronJames_Salary,
ChrisPaul_Salary, DerrickRose_Salary, DwayneWade_Salary,
KevinDurant_Salary)
colnames(Salary) <- Seasons
rownames(Salary) <- Players

#Games
KobeBryant_G <- c(80,77,82,82,73,82,58,78,6,35)
JoeJohnson_G <- c(82,57,82,79,76,72,60,72,79,80)
LeBronJames_G <- c(79,78,75,81,76,79,62,76,77,69)
CarmeloAnthony_G <- c(80,65,77,66,69,77,55,67,77,40)
DwightHoward_G <- c(82,82,82,79,82,78,54,76,71,41)
ChrisBosh_G <- c(70,69,67,77,70,77,57,74,79,44)
ChrisPaul_G <- c(78,64,80,78,45,80,60,70,62,82)
KevinDurant_G <- c(35,35,80,74,82,78,66,81,81,27)
DerrickRose_G <- c(40,40,40,81,78,81,39,0,10,51)
DwayneWade_G <- c(75,51,51,79,77,76,49,69,54,62)
#Matrix
Games <- rbind(KobeBryant_G, JoeJohnson_G, LeBronJames_G,
CarmeloAnthony_G, DwightHoward_G, ChrisBosh_G, ChrisPaul_G,
KevinDurant_G, DerrickRose_G, DwayneWade_G)
rm(KobeBryant_G, JoeJohnson_G, CarmeloAnthony_G, DwightHoward_G,
ChrisBosh_G, LeBronJames_G, ChrisPaul_G, DerrickRose_G, DwayneWade_G,
KevinDurant_G)
colnames(Games) <- Seasons
rownames(Games) <- Players

#Minutes Played
KobeBryant_MP <- c(3277,3140,3192,2960,2835,2779,2232,3013,177,1207)
JoeJohnson_MP <- c(3340,2359,3343,3124,2886,2554,2127,2642,2575,2791)
LeBronJames_MP <- c(3361,3190,3027,3054,2966,3063,2326,2877,2902,2493)
CarmeloAnthony_MP <-

```

```

c(2941,2486,2806,2277,2634,2751,1876,2482,2982,1428)
DwightHoward_MP <-
c(3021,3023,3088,2821,2843,2935,2070,2722,2396,1223)
ChrisBosh_MP <- c(2751,2658,2425,2928,2526,2795,2007,2454,2531,1556)
ChrisPaul_MP <- c(2808,2353,3006,3002,1712,2880,2181,2335,2171,2857)
KevinDurant_MP <- c(1255,1255,2768,2885,3239,3038,2546,3119,3122,913)
DerrickRose_MP <- c(1168,1168,1168,3000,2871,3026,1375,0,311,1530)
DwayneWade_MP <- c(2892,1931,1954,3048,2792,2823,1625,2391,1775,1971)
#Matrix
MinutesPlayed <- rbind(KobeBryant_MP, JoeJohnson_MP, LeBronJames_MP,
CarmeloAnthony_MP, DwightHoward_MP, ChrisBosh_MP, ChrisPaul_MP,
KevinDurant_MP, DerrickRose_MP, DwayneWade_MP)
rm(KobeBryant_MP, JoeJohnson_MP, CarmeloAnthony_MP, DwightHoward_MP,
ChrisBosh_MP, LeBronJames_MP, ChrisPaul_MP, DerrickRose_MP,
DwayneWade_MP, KevinDurant_MP)
colnames(MinutesPlayed) <- Seasons
rownames(MinutesPlayed) <- Players

#Field Goals
KobeBryant_FG <- c(978,813,775,800,716,740,574,738,31,266)
JoeJohnson_FG <- c(632,536,647,620,635,514,423,445,462,446)
LeBronJames_FG <- c(875,772,794,789,768,758,621,765,767,624)
CarmeloAnthony_FG <- c(756,691,728,535,688,684,441,669,743,358)
DwightHoward_FG <- c(468,526,583,560,510,619,416,470,473,251)
ChrisBosh_FG <- c(549,543,507,615,600,524,393,485,492,343)
ChrisPaul_FG <- c(407,381,630,631,314,430,425,412,406,568)
KevinDurant_FG <- c(306,306,587,661,794,711,643,731,849,238)
DerrickRose_FG <- c(208,208,208,574,672,711,302,0,58,338)
DwayneWade_FG <- c(699,472,439,854,719,692,416,569,415,509)
#Matrix
FieldGoals <- rbind(KobeBryant_FG, JoeJohnson_FG, LeBronJames_FG,
CarmeloAnthony_FG, DwightHoward_FG, ChrisBosh_FG, ChrisPaul_FG,
KevinDurant_FG, DerrickRose_FG, DwayneWade_FG)
rm(KobeBryant_FG, JoeJohnson_FG, LeBronJames_FG, CarmeloAnthony_FG,
DwightHoward_FG, ChrisBosh_FG, ChrisPaul_FG, KevinDurant_FG,
DerrickRose_FG, DwayneWade_FG)
colnames(FieldGoals) <- Seasons
rownames(FieldGoals) <- Players

#Field Goal Attempts
KobeBryant_FGA <- c(2173,1757,1690,1712,1569,1639,1336,1595,73,713)

```

```

JoeJohnson_FGA <- c(1395,1139,1497,1420,1386,1161,931,1052,1018,1025)
LeBronJames_FGA <-
c(1823,1621,1642,1613,1528,1485,1169,1354,1353,1279)
CarmeloAnthony_FGA <-
c(1572,1453,1481,1207,1502,1503,1025,1489,1643,806)
DwightHoward_FGA <- c(881,873,974,979,834,1044,726,813,800,423)
ChrisBosh_FGA <- c(1087,1094,1027,1263,1158,1056,807,907,953,745)
ChrisPaul_FGA <- c(947,871,1291,1255,637,928,890,856,870,1170)
KevinDurant_FGA <- c(647,647,1366,1390,1668,1538,1297,1433,1688,467)
DerrickRose_FGA <- c(436,436,436,1208,1373,1597,695,0,164,835)
DwayneWade_FGA <- c(1413,962,937,1739,1511,1384,837,1093,761,1084)
#Matrix
FieldGoalAttempts <- rbind(KobeBryant_FGA, JoeJohnson_FGA,
LeBronJames_FGA, CarmeloAnthony_FGA, DwightHoward_FGA, ChrisBosh_FGA,
ChrisPaul_FGA, KevinDurant_FGA, DerrickRose_FGA, DwayneWade_FGA)
rm(KobeBryant_FGA, JoeJohnson_FGA, LeBronJames_FGA,
CarmeloAnthony_FGA, DwightHoward_FGA, ChrisBosh_FGA, ChrisPaul_FGA,
KevinDurant_FGA, DerrickRose_FGA, DwayneWade_FGA)
colnames(FieldGoalAttempts) <- Seasons
rownames(FieldGoalAttempts) <- Players

#Points
KobeBryant_PTS <- c(2832,2430,2323,2201,1970,2078,1616,2133,83,782)
JoeJohnson_PTS <- c(1653,1426,1779,1688,1619,1312,1129,1170,1245,1154)
LeBronJames_PTS <-
c(2478,2132,2250,2304,2258,2111,1683,2036,2089,1743)
CarmeloAnthony_PTS <-
c(2122,1881,1978,1504,1943,1970,1245,1920,2112,966)
DwightHoward_PTS <-
c(1292,1443,1695,1624,1503,1784,1113,1296,1297,646)
ChrisBosh_PTS <- c(1572,1561,1496,1746,1678,1438,1025,1232,1281,928)
ChrisPaul_PTS <- c(1258,1104,1684,1781,841,1268,1189,1186,1185,1564)
KevinDurant_PTS <- c(903,903,1624,1871,2472,2161,1850,2280,2593,686)
DerrickRose_PTS <- c(597,597,597,1361,1619,2026,852,0,159,904)
DwayneWade_PTS <- c(2040,1397,1254,2386,2045,1941,1082,1463,1028,1331)
#Matrix
Points <- rbind(KobeBryant_PTS, JoeJohnson_PTS, LeBronJames_PTS,
CarmeloAnthony_PTS, DwightHoward_PTS, ChrisBosh_PTS, ChrisPaul_PTS,
KevinDurant_PTS, DerrickRose_PTS, DwayneWade_PTS)
rm(KobeBryant_PTS, JoeJohnson_PTS, LeBronJames_PTS,
CarmeloAnthony_PTS, DwightHoward_PTS, ChrisBosh_PTS, ChrisPaul_PTS,

```

```
KevinDurant_PTS, DerrickRose_PTS, DwayneWade_PTS)
colnames(Points) <- Seasons
rownames(Points) <- Players
```

### *# Matrix Operations ----*

FieldGoals

```
##           2005 2006 2007 2008 2009 2010 2011 2012 2013 2014
## KobeBryant    978  813  775  800  716  740  574  738   31  266
## JoeJohnson    632  536  647  620  635  514  423  445  462  446
## LeBronJames    875  772  794  789  768  758  621  765  767  624
## CarmeloAnthony 756  691  728  535  688  684  441  669  743  358
## DwightHoward   468  526  583  560  510  619  416  470  473  251
## ChrisBosh      549  543  507  615  600  524  393  485  492  343
## ChrisPaul      407  381  630  631  314  430  425  412  406  568
## KevinDurant    306  306  587  661  794  711  643  731  849  238
## DerrickRose    208  208  208  574  672  711  302    0   58  338
## DwayneWade     699  472  439  854  719  692  416  569  415  509
```

```
round(FieldGoals/Games, 1)
```

```
##           2005 2006 2007 2008 2009 2010 2011 2012 2013 2014
## KobeBryant   12.2 10.6  9.5  9.8  9.8  9.0  9.9  9.5  5.2  7.6
## JoeJohnson    7.7  9.4  7.9  7.8  8.4  7.1  7.0  6.2  5.8  5.6
## LeBronJames   11.1  9.9 10.6  9.7 10.1  9.6 10.0 10.1 10.0  9.0
## CarmeloAnthony  9.4 10.6  9.5  8.1 10.0  8.9  8.0 10.0  9.6  8.9
## DwightHoward   5.7  6.4  7.1  7.1  6.2  7.9  7.7  6.2  6.7  6.1
## ChrisBosh      7.8  7.9  7.6  8.0  8.6  6.8  6.9  6.6  6.2  7.8
## ChrisPaul      5.2  6.0  7.9  8.1  7.0  5.4  7.1  5.9  6.5  6.9
## KevinDurant    8.7  8.7  7.3  8.9  9.7  9.1  9.7  9.0 10.5  8.8
## DerrickRose    5.2  5.2  5.2  7.1  8.6  8.8  7.7  NaN  5.8  6.6
## DwayneWade     9.3  9.3  8.6 10.8  9.3  9.1  8.5  8.2  7.7  8.2
```

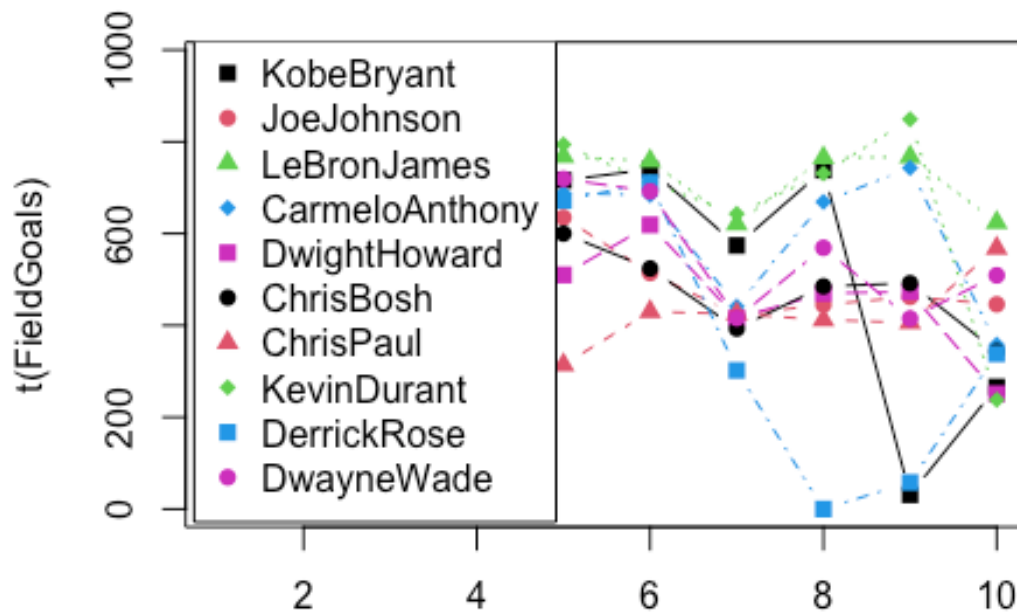
```
round(MinutesPlayed/Games)
```

```
##           2005 2006 2007 2008 2009 2010 2011 2012 2013 2014
## KobeBryant    41   41   39   36   39   34   38   39   30   34
## JoeJohnson    41   41   41   40   38   35   35   37   33   35
## LeBronJames    43   41   40   38   39   39   38   38   38   36
## CarmeloAnthony 37   38   36   34   38   36   34   37   39   36
```

```
## DwightHoward      37   37   38   36   35   38   38   36   34   30
## ChrisBosh         39   39   36   38   36   36   35   33   32   35
## ChrisPaul         36   37   38   38   38   36   36   33   35   35
## KevinDurant       36   36   35   39   40   39   39   39   39   34
## DerrickRose       29   29   29   37   37   37   35   NaN   31   30
## DwayneWade        39   38   38   39   36   37   33   35   33   32
```

*# Vizualizing with Matplot()----*

```
matplot(t(FieldGoals), type="b", pch=15:18, col=c(1:4,6))
legend("bottomleft", inset=0.01,
legend=Players,col=c(1:4,6),pch=15:18, horiz=F)
```



```
matplot(t(FieldGoals/FieldGoalAttempts), type="b", pch=15:18,
col=c(1:4,6))
```

```
legend("bottomleft", inset=0.01,  
legend=Players,col=c(1:4,6),pch=15:18, horiz=F)
```

