Lampiran 12 *Output Brown's Weighted Exponential Moving Average* (B-WEMA)

```
> data.cp=read.delim("clipboard",header=TRUE)
> head(data.cp)
  Close
1  2150
2  2180
3  2190
4  2380
5  2320
6  2320
> library(minpack.lm)
> bwema=function(par,data.cp)
+ {
+   #panjang data
+   n=(dim(data.cp))[1];
+   N=n+1
+
+   #pembentukan matriks
+   F0=matrix(0,n,1);
+   S1=matrix(0,n,1);
+   S2=matrix(0,n,1);
+   a=matrix(0,n,1);
+   b=matrix(0,n,1);
+
+   #initial value
+   S1[5]=(((data.cp[5,1]*5)+(data.cp[4,1]*4)+(data.cp[3,1]*3)+
+            (data.cp[2,1]*2)+(data.cp[1,1]*1))/(sum(1:5)));
+   S2[5]=(((data.cp[5,1]*5)+(data.cp[4,1]*4)+(data.cp[3,1]*3)+
+             (data.cp[2,1]*2)+(data.cp[1,1]*1))/(sum(1:5)));
+   a[5]=(((data.cp[5,1]*5)+(data.cp[4,1]*4)+(data.cp[3,1]*3)+
+            (data.cp[2,1]*2)+(data.cp[1,1]*1))/(sum(1:5)));
+
+   for (i in 6:N)
+   {
+     S1[i]=par*data.cp[i,1]+(1-par)*S1[i-1];
+     S2[i]=par*S1[i]+(1-par)*S2[i-1];
+     b[i]=par/(1-par)*(S1[i]-S2[i]);
+     a[i]=2*S1[i]-S2[i];

+     F0[i]=a[i-1]+b[i-1];
+   }
+     return(F0)
+ }
> forecast = bwema(0.1,data.cp)
> data=as.data.frame(forecast)
> head(forecast)
     [,1]
[1,]    0
[2,]    0
[3,]    0
[4,]    0
[5,]    0
[6,] 2280
> View(forecast)
```

1	0.000
2	0.000
3	0.000
4	0.000
5	0.000
6	2280.000
7	2288.000
8	2288.800
9	2281.460
10	2287.200

11	2296.077
12	2297.607
13	2302.870
14	2317.305
15	2333.524
16	2361.226
17	2380.652
18	2390.981
19	2389.538
20	2382.073
21	2389.506
22	2387.632
23	2387.837

Showing 1 to 23 of 257 entries

235	2280.793
236	2283.895
237	2287.870
238	2294.610
239	2285.724
240	2279.568
241	2283.787
242	2304.866
243	2320.292
244	2350.884
245	2368.354
246	2380.622
247	2400.452
248	2416.710
249	2441.912
250	2458.707
251	2460.323
252	2461.029
253	2464.991
254	2471.750
255	2484.907
256	2495.516
257	2499.953

Showing 235 to 257 of 257 entries

```
> msebwema=function(par,data)
+ {
+   n=nrow(data.cp);
+   forecast=bwema(par,data.cp);
+   data = as.data.frame(forecast);
+   error2=(data[6:n,]-data.cp[6:n,])^2
+   msebwema=mean(error2)
+ }
```

```
> mapebwema=function(par,data)
+   {
+   n=nrow(data.cp);
+   data.cp2=data.cp[6:n,]
+   forecast=bwema(par,data.cp);
+   data= as.data.frame(forecast);
+   error=(data[6:n,]-data.cp[6:n,])
+   pei=(error/data.cp2)*-1
+   mapebwema=mean(abs(pei))*100
+ }
> mse= msebwema(0.1,data.cp)
> mse
[1] 5125.697
> mape= mapebwema(0.1,data.cp)
> mape
[1] 2.565079
> #optimasi algoritma lm
> lm=nls.lm(c(0.1),lower=NULL,upper=NULL,msebwema,data=data.cp)
> lm
Nonlinear regression via the Levenberg-Marquardt algorithm
parameter estimates: 0.445170700228326
residual sum-of-squares: 6793619
reason terminated: Relative error in the sum of squares is at most `ftol'.
> forecast.op= bwema(0.4452,data.cp)
> data=as.data.frame(forecast)
> head(forecast.op)
     [,1]
[1,]    0
[2,]    0
[3,]    0
[4,]    0
[5,]    0
[6,] 2280
> View(forecast.op)
```

1	0.000
2	0.000
3	0.000
4	0.000
5	0.000
6	2280.000
7	2315.616
8	2300.736
9	2258.412
10	2297.141
11	2329.419
12	2312.757
13	2322.908
14	2369.976
15	2402.277
16	2472.114
17	2473.401
18	2440.465
19	2379.769
20	2330.456
21	2377.515
22	2360.841
23	2364.446

Showing 1 to 23 of 257 entries

235	2259.150
236	2230.023
237	2229.957
238	2249.735
239	2195.529
240	2186.653
241	2231.086
242	2328.648
243	2352.023
244	2434.989
245	2421.940
246	2400.706
247	2432.605
248	2439.925
249	2491.653
250	2487.457
251	2427.300
252	2403.372
253	2413.147
254	2435.322
255	2478.691
256	2492.299
257	2476.242

Showing 235 to 257 of 257 entries

```
> msebwema.op=function(par,data)
+ {
+   n=nrow(data.cp);
+   forecast.op=bwema(par,data.cp);
+   data = as.data.frame(forecast.op);
+   error2=(data[6:n,]-data.cp[6:n,])^2
+   msebwema.op=mean(error2)
+ }
> mapebwema.op=function(par,data)
+ {
+   n=nrow(data.cp);
+   data.cp2=data.cp[6:n,]
+   forecast.op=bwema(par,data.cp);
+   data= as.data.frame(forecast.op);
+   error=(data[6:n,]-data.cp[6:n,])
+   pei=(error/data.cp2)*-1
+   mapebwema.op=mean(abs(pei))*100
+ }
> mse.op= msebwema.op(0.4452,data.cp)
> mse.op
[1] 2606.457
> mape.op= mapebwema.op(0.4452,data.scp)
> mape.op
[1] 1.705713
```