

### Lampiran 8 Output Brown's Double Exponential Smoothing (B-DES)

```

> data.cp=read.delim("C:\1pboard",header=TRUE)
> head(data.cp)
  close
1  2150
2  2180
3  2190
4  2380
5  2320
6  2320
> library(minpack.lm)
> bdes=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]=(mean(data.cp[1:5]));
+   S2[5]=(mean(data.cp[1:5]));
+   a[5]=(mean(data.cp[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 = bdes(0.1,data.cp)
> head(forecast)
[1] 0 0 0 0 0 2244
> data=as.data.frame(forecast)
> View(forecast)

```

1	0.000
2	0.000
3	0.000
4	0.000
5	0.000
6	2244.000
7	2259.200
8	2266.120
9	2263.964
10	2274.078

11	2286.630
12	2291.230
13	2299.044
14	2315.583
15	2333.524
16	2362.621
17	2383.163
18	2394.370
19	2393.605
20	2386.648
21	2394.447
22	2392.820
23	2393.174

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

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

```

> mapebdes=function(par , data)
+ {
+   n=nrow(data.cp);
+   data.cp2=data.cp[6:n,]
+   forecast=bdes(par , data.cp);
+   data= as.data.frame(forecast);
+   error=(data[6:n,]-data.cp[6:n,])
+   pei=(error/data.cp2)*-1
+   mapebdes=mean(abs(pei))*100
+ }
> mse= msebdes(0.1,data.cp)
> mse
[1] 5185.443
> mape= mapebdes(0.1,data.cp)
> mape
[1] 2.58915

> mse= msebdes(0.1,data.cp)
> mse
[1] 5185.443
> mape= mapebdes(0.1,data.cp)
> mape
[1] 2.58915
> #optimasi algoritma lm
> lm=nlm(lm(c(0.1),lower=NULL,upper=NULL,msebdes ,data=data.cp)
> lm
Nonlinear regression via the Levenberg-Marquardt algorithm
parameter estimates: 0.442045426022297
residual sum-of-squares: 6866065
reason terminated: Relative error in the sum of squares is at most `ftol`.
> forecast.op=bdes(0.4420,data.cp)
> head(forecast.op)
[1] 0 0 0 0 0 2244
> data=as.data.frame(forecast.op)
> view(forecast.op)

```

1	0.000
2	0.000
3	0.000
4	0.000
5	0.000
6	2244.000
7	2311.184
8	2307.305
9	2267.356
10	2304.567
11	2334.895
12	2316.861
13	2325.632
14	2371.463
15	2403.127
16	2472.302
17	2473.757
18	2441.095
19	2380.650
20	2331.276
21	2377.533
22	2360.965
23	2364.458

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235	2260.205
236	2230.800
237	2230.328
238	2249.750
239	2195.920
240	2186.843
241	2230.787
242	2327.783
243	2351.531
244	2434.279
245	2421.894
246	2401.013
247	2432.653
248	2440.032
249	2491.456
250	2487.550
251	2427.911
252	2403.889
253	2413.330
254	2435.252
255	2478.366
256	2492.109
257	2476.342

Showing 235 to 257 of 257 entries

```
> msebdes.op=function(par ,data.cp)
+ {
+   n=nrow(data.cp);
+   forecast.opt=bdes(par ,data.cp);
+   data = as.data.frame(forecast.op);
+   error2=(data[6:n,]-data.cp[6:n,])^2
+   msebdes.op=mean(error2)
+ }
> mapebdes.op=function(par ,data)
+ {
+   n=nrow(data.cp);
+   data.cp2=data.cp[6:n,]
+   forecast.op=bdes(par ,data.cp);
+   data= as.data.frame(forecast.op);
+   error=(data[6:n,]-data.cp[6:n,])
+   pei=(error/data.cp2)*-1
+   mapebdes.op=mean(abs(pei))*100
+ }
> mse.op= msebdes.op(0.4420,data.cp)
> mse.op
[1] 2620.318
> mape.op= mapebdes(0.4420,data.cp)
> mape.op
[1] 1.709257
```