

# Motion Planning Experiments

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## Ingesta de los datos

```
db <- read_csv("./data/ExperimentosCINVESTAV.csv")

## Rows: 51 Columns: 9

## -- Column specification -----
## Delimiter: ","
## dbl (8): NoExperimento, Burbujeos, M, Bolsas, TimeExec (hrs), TiempoXBurbuj...
## date (1): Fecha

##
## i Use `spec()` to retrieve the full column specification for this data.
## i Specify the column types or set `show_col_types = FALSE` to quiet this message.

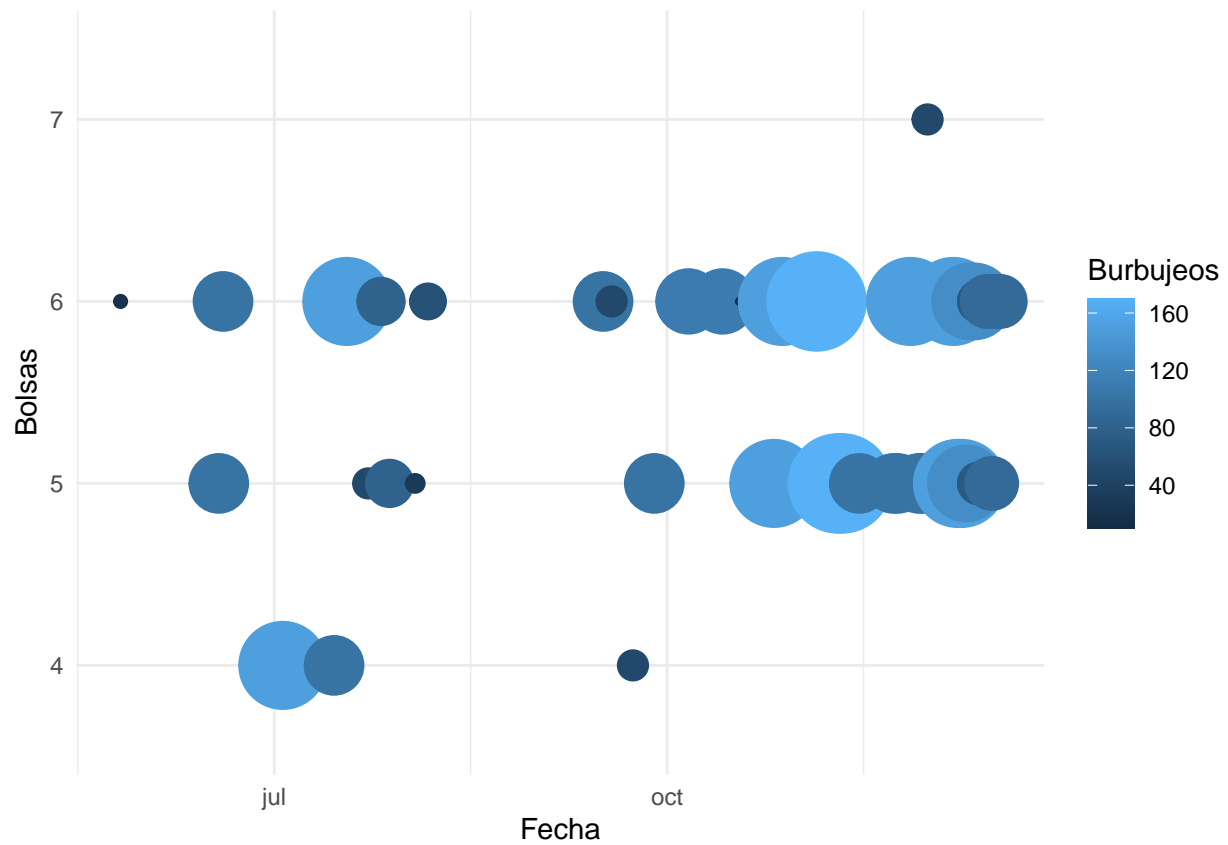
db %>%
  select(-Nodos, -Cores) %>%
  knitr::kable("simple")
```

NoExperimento	Fecha	Burbujeos	M	Bolsas	TimeExec (hrs)	TiempoXBurbujeo (min)
0	2021-05-26	20	12000	6	1.220616	3.661850
1	2021-06-16	40	30000	5	5.803910	8.705865
2	2021-06-17	60	30000	6	7.682509	7.682509
3	2021-06-17	60	40000	5	10.742562	10.742562
4	2021-06-18	100	30000	5	11.609200	6.965520
5	2021-06-19	100	40000	6	16.587595	9.950000
6	2021-07-03	150	40000	4	28.187096	11.274838
7	2021-07-15	100	50000	4	25.630360	15.378220
8	2021-07-18	150	50000	6	28.751424	11.500570
9	2021-07-23	50	70000	5	16.559503	19.871404
10	2021-07-26	80	70000	6	22.645259	16.983944
11	2021-07-28	80	70000	5	24.016496	18.012372
12	2021-08-03	30	100000	5	14.701059	29.402118
13	2021-08-04	30	100000	6	12.876552	25.753105
14	2021-08-06	60	100000	6	24.861101	24.861101
15	2021-09-16	100	40000	6	16.463833	9.878300
16	2021-09-18	50	70000	6	14.157590	16.989108
17	2021-09-23	50	70000	4	16.782716	20.139260
18	2021-09-28	100	100000	5	45.325611	27.195366
19	2021-10-06	110	110000	6	51.110533	27.878472
20	2021-10-14	110	110000	6	50.322736	27.448765
21	2021-10-18	10	100000	6	5.762292	34.573752
22	2021-10-25	10	100000	6	5.933560	35.601361

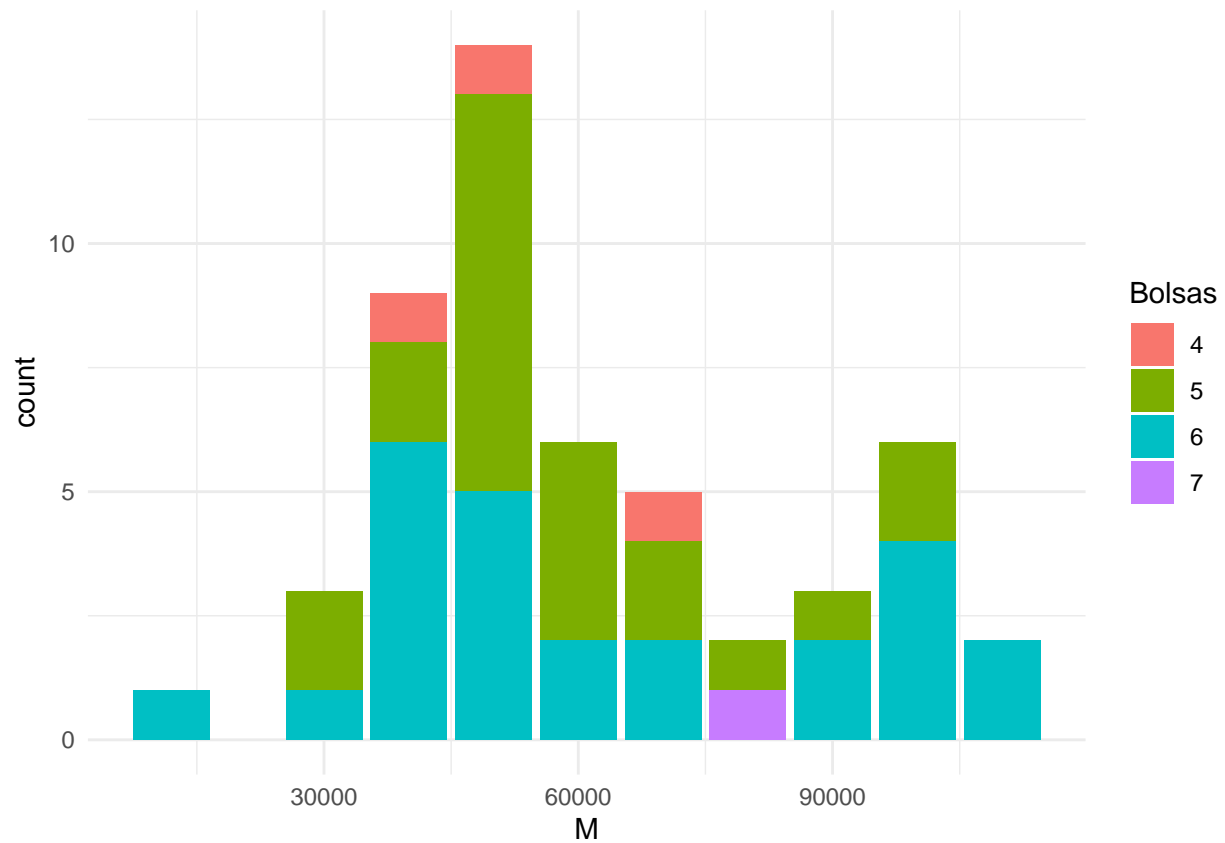
NoExperimento	Fecha	Burbujeos	M	Bolsas	TimeExec (hrs)	TiempoXBurbujeo (min)
23	2021-10-26	150	50000	5	34.849754	13.939902
24	2021-10-28	150	50000	6	32.990967	13.196387
25	2021-11-05	170	40000	6	30.924505	10.914531
26	2021-11-10	170	50000	5	37.237635	13.142695
27	2021-11-11	170	50000	5	40.960043	14.456486
28	2021-11-15	100	50000	5	22.811028	13.686616
29	2021-11-23	100	50000	5	21.866167	13.119700
30	2021-11-24	100	50000	5	21.383438	12.830063
31	2021-11-27	150	60000	6	36.229730	14.491892
32	2021-11-28	50	60000	5	13.748858	16.498630
33	2021-11-29	100	60000	5	26.291749	15.775050
33	2021-11-30	100	80000	5	35.925815	21.555489
34	2021-12-01	50	80000	7	16.787478	20.144974
35	2021-12-07	150	60000	6	38.932332	15.572933
36	2021-12-08	150	60000	5	42.153250	16.861300
37	2021-12-09	150	60000	5	43.390767	17.356307
38	2021-12-10	130	90000	5	54.513671	25.160156
39	2021-12-11	130	90000	6	47.545218	21.943947
40	2021-12-12	130	90000	6	55.935811	25.816528
41	2021-12-13	70	50000	6	16.093585	13.794501
42	2021-12-13	70	50000	6	14.732186	12.627588
43	2021-12-13	70	50000	6	14.090538	12.077604
44	2021-12-13	70	50000	5	17.706289	15.176820
45	2021-12-13	70	50000	5	14.603834	12.517572
46	2021-12-15	90	40000	6	14.766180	9.844120
47	2021-12-16	90	40000	5	16.067519	10.711679
48	2021-12-17	90	40000	6	16.196666	10.797778
49	2021-12-18	90	40000	6	14.468866	9.645911

## Análisis Univariado

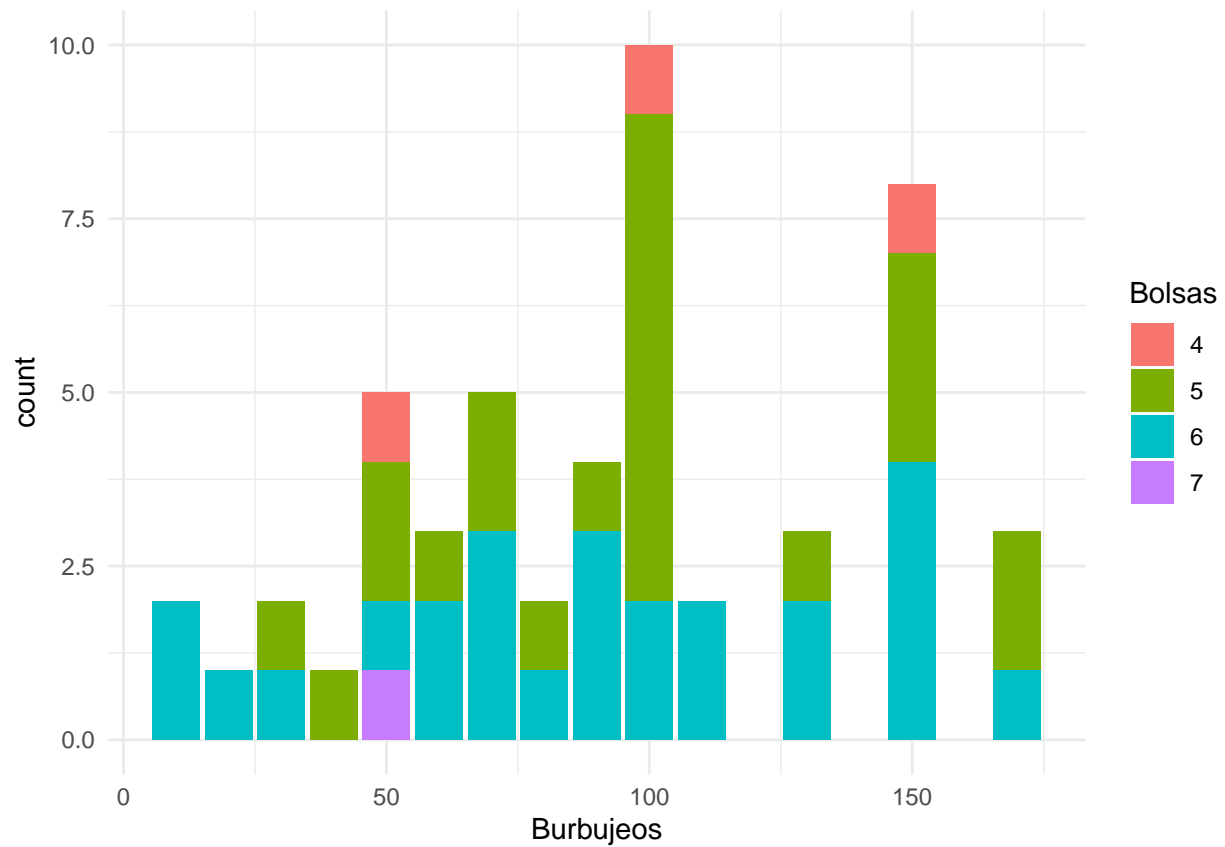
```
db %>%
  mutate(Bolsas = forcats::as_factor(Bolsas)) %>%
  ggplot(aes(x = Fecha, y = Bolsas, fill = Burbujeos, color = Burbujeos))+
  geom_point(size = db$Burbujeos/10) +
  theme_minimal()
```



```
db %>%
  mutate(Bolsas = forcats::as_factor(Bolsas)) %>%
  ggplot(aes(x = M, fill = Bolsas))+
  # geom_bar(position=position_dodge())+
  geom_bar() +
  theme_minimal()
```



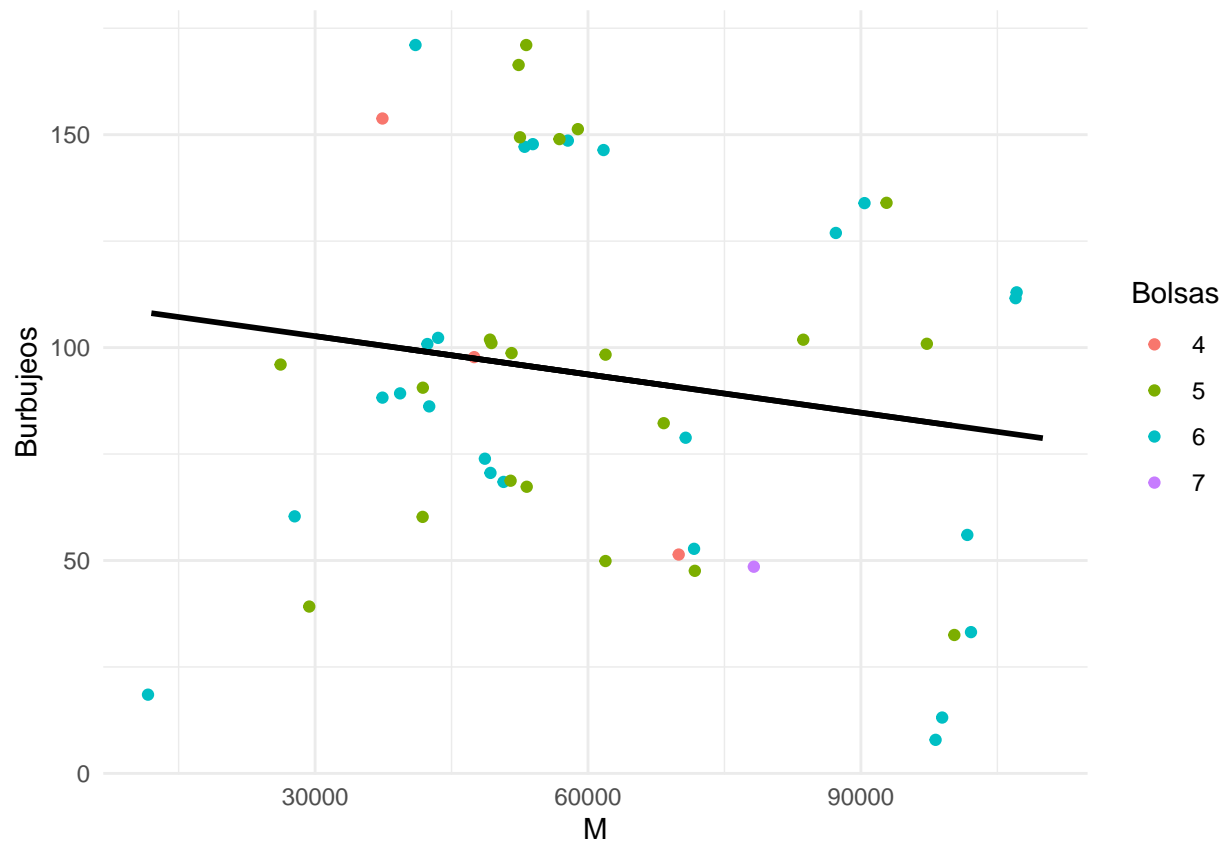
```
db %>%
  mutate(Bolsas = forcats::as_factor(Bolsas)) %>%
  ggplot(aes(x = Burbujeos, fill = Bolsas))+
  # geom_bar(position=position_dodge())+
  geom_bar() +
  theme_minimal()
```



## Análisis Multivariado

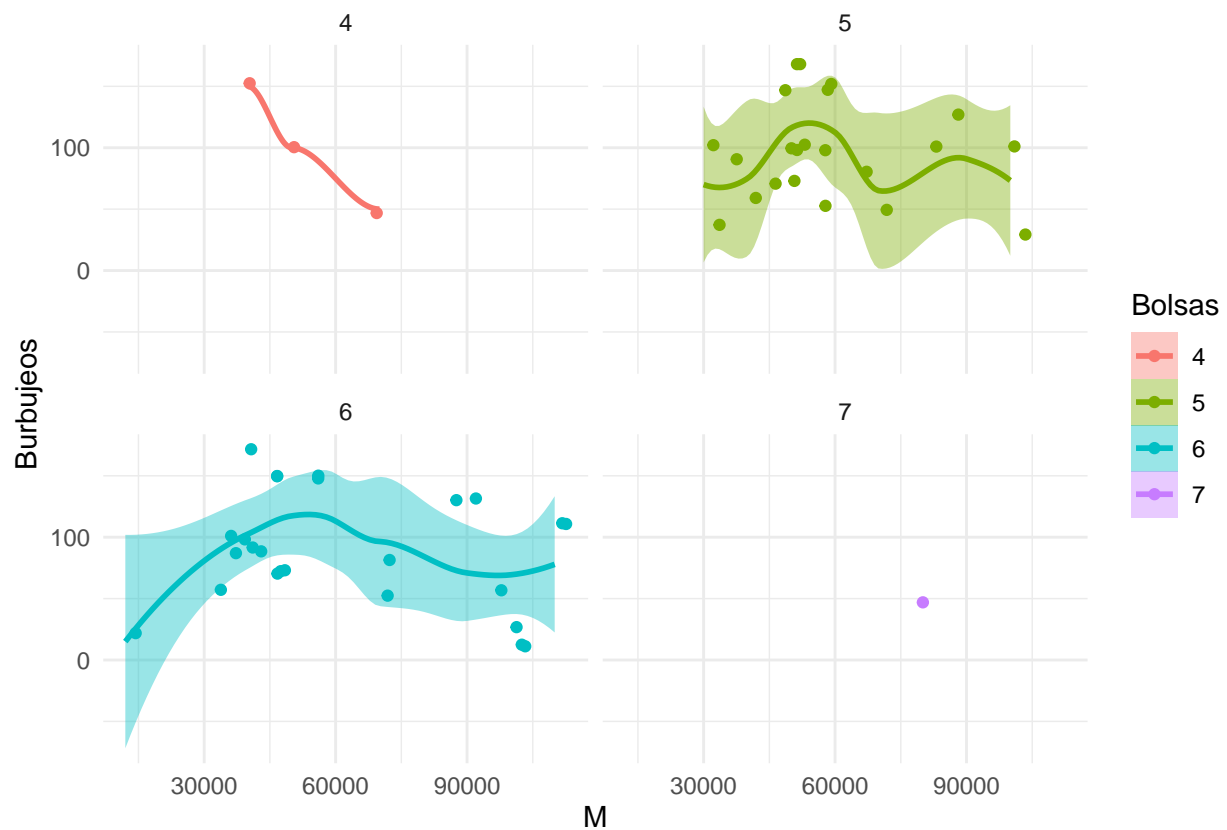
```
sim_mod <- lm(Burbujeos ~ M , data = db)

db %>%
  mutate(Bolsas = forcats::as_factor(Bolsas)) %>%
  modelr::add_predictions(sim_mod) %>%
  ggplot(aes(x = M, y = Burbujeos))+
  geom_jitter(aes(fill = Bolsas, color=Bolsas)) +
  geom_line(aes(y = pred, fill = Bolsas), size = 1) +
  theme_minimal()
```



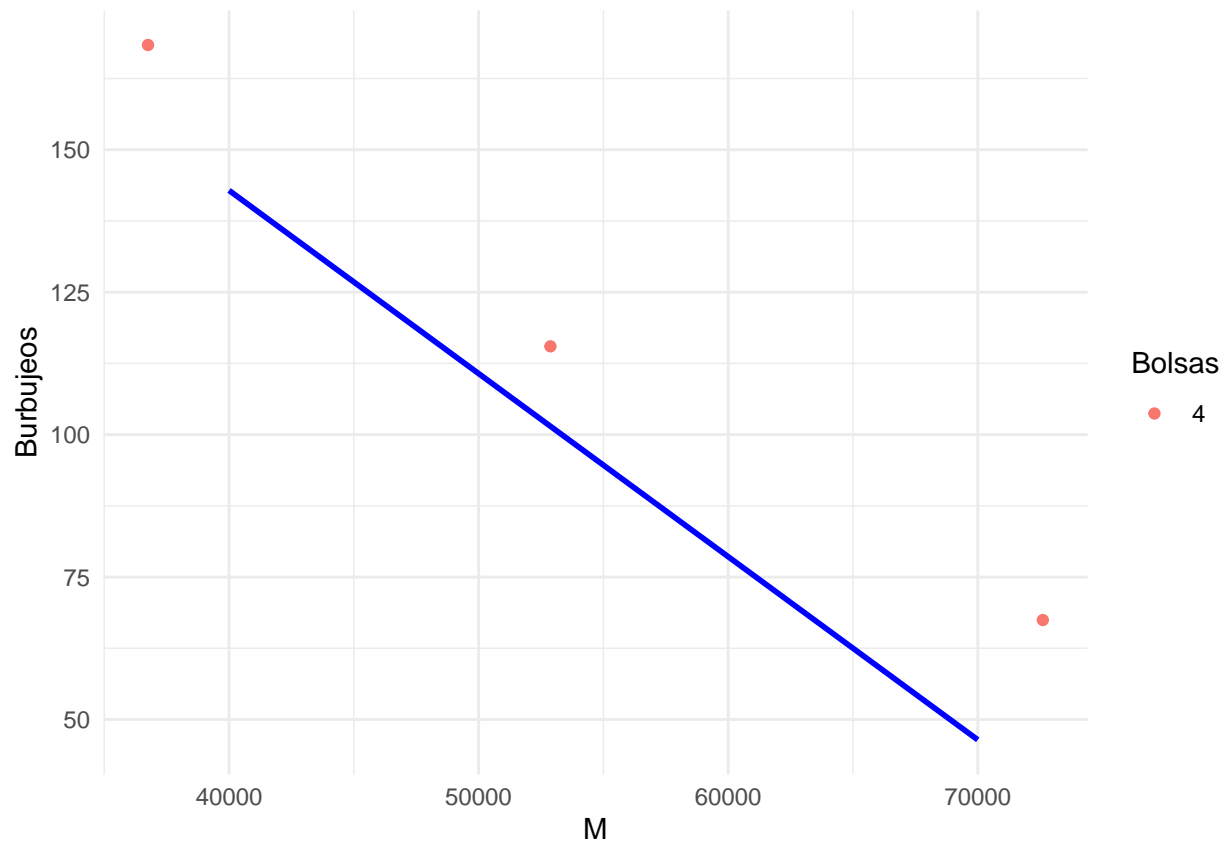
```
db %>%
  mutate(Bolsas = forcats::as_factor(Bolsas)) %>%
  ggplot(aes(x = M, y = Burbujeos, fill = Bolsas, color = Bolsas)) +
  # geom_line() +
  geom_jitter() +
  geom_smooth() +
  theme_minimal() +
  facet_wrap(nrow = 3, .~Bolsas)
```

```
## `geom_smooth()` using method = 'loess' and formula 'y ~ x'
```



```
db_1 <- db %>% filter(Bolsas == 4)
sim1_mod <- lm(Burbujeos ~ M , data = db_1)

db_1 %>%
  mutate(Bolsas = forcats::as_factor(Bolsas)) %>%
  modelr::add_predictions(sim1_mod) %>%
  ggplot(aes(x = M, y = Burbujeos, fill = Bolsas, color = Bolsas)) +
  geom_jitter() +
  geom_line(aes(y = pred, fill = Bolsas), colour = "blue", size = 1) +
  theme_minimal()
```

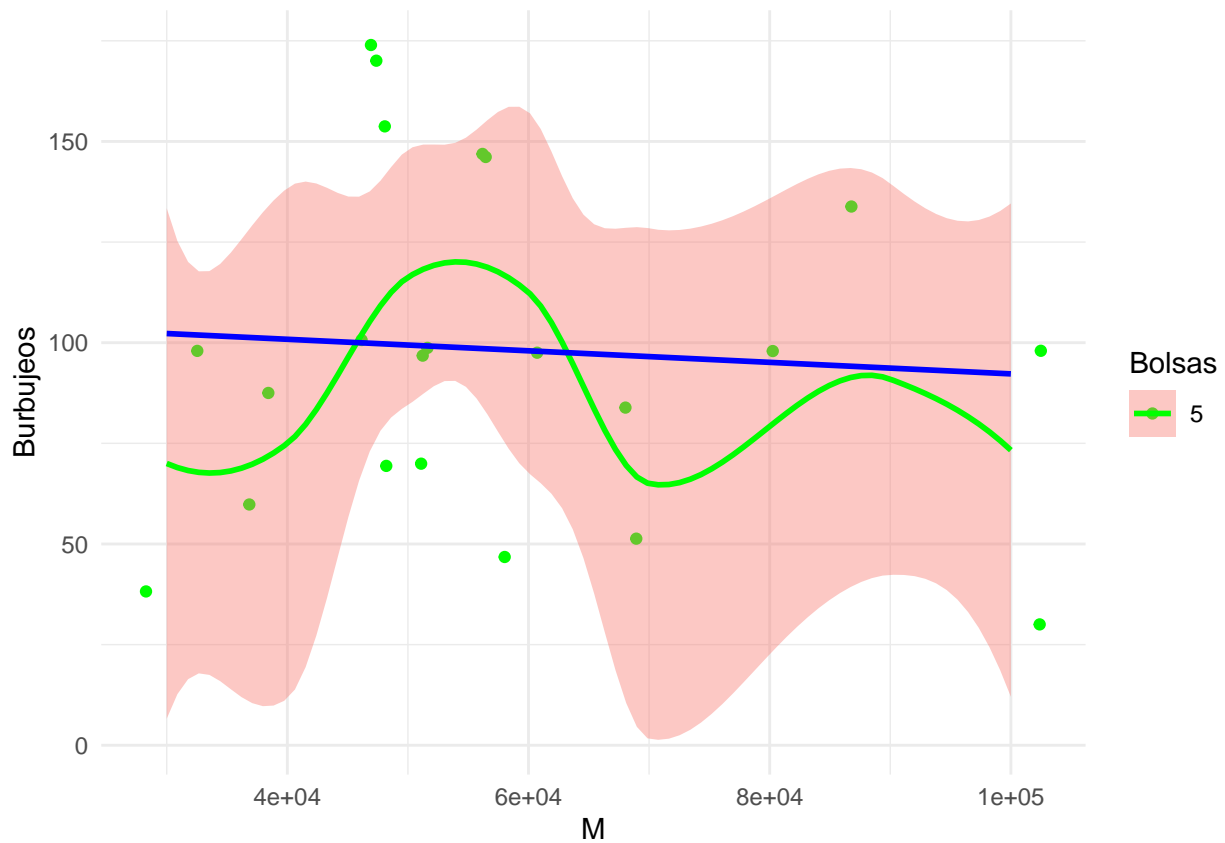


```
db_2 <- db %>% filter(Bolsas == 5)
sim2_mod <- lm(Burbujeos ~ M , data = db_2)

db_2 %>%
  mutate(Bolsas = forcats::as_factor(Bolsas)) %>%
  modelr::add_predictions(sim2_mod) %>%
  ggplot(aes(x = M, y = Burbujeos, fill = Bolsas, color = Bolsas))+
  geom_jitter(color = "green")+
  geom_smooth(color = "green")+
  geom_line(aes(y = pred, fill = Bolsas), colour = "blue", size = 1) +
  theme_minimal()
```

```
## `geom_smooth()` using method = 'loess' and formula 'y ~ x'
```

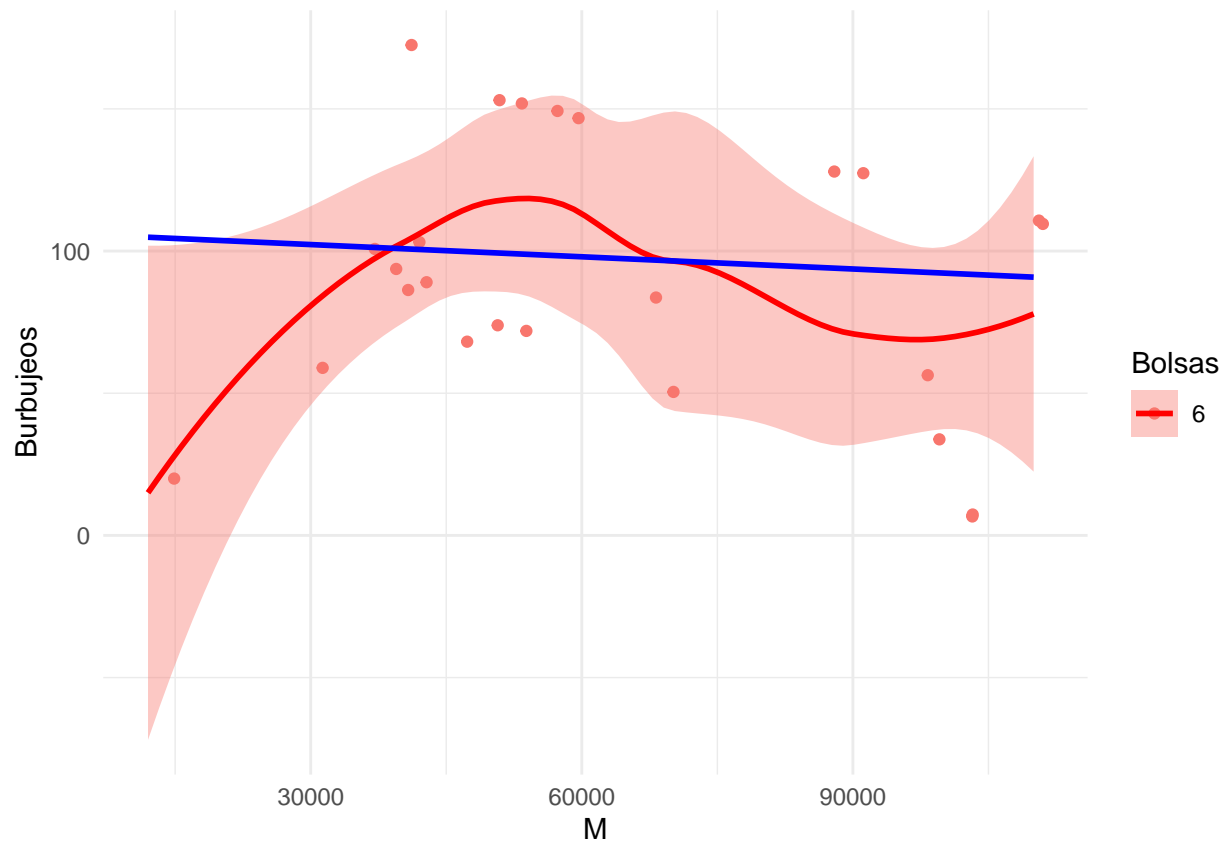




```
db_3 <- db %>% filter(Bolsas == 6)
sim3_mod <- lm(Burbujeos ~ M , data = db_3)

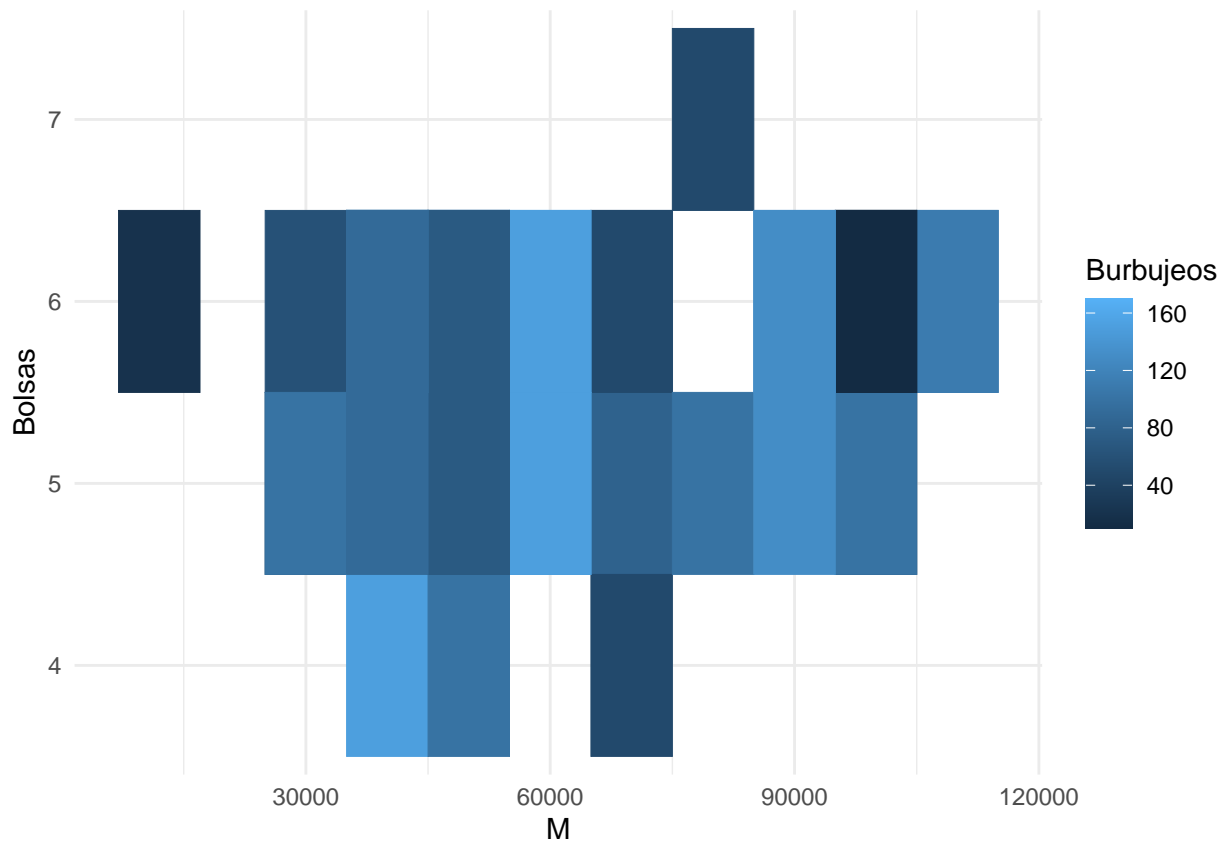
db_3 %>%
  mutate(Bolsas = forcats::as_factor(Bolsas)) %>%
  modelr::add_predictions(sim2_mod) %>%
  ggplot(aes(x = M, y = Burbujeos, fill = Bolsas, color = Bolsas))+
  geom_jitter() +
  geom_smooth(color = "red")+
  geom_line(aes(y = pred, fill = Bolsas), colour = "blue", size = 1) +
  theme_minimal()

## `geom_smooth()` using method = 'loess' and formula 'y ~ x'
```

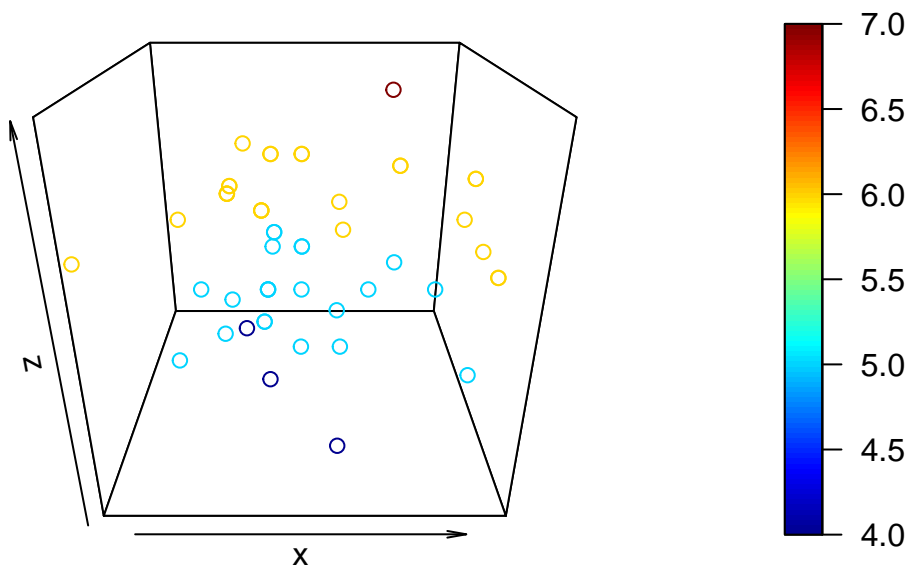


```
# facet_wrap(nrow = 3, .~Bolsas)
```

```
db %>%
  mutate(Bolsas = forcats::as_factor(Bolsas)) %>%
  ggplot(aes(x = M, y = Bolsas))+
  geom_tile(aes(fill = Burbujeos, color = Burbujeos)) +
  theme_minimal()
```



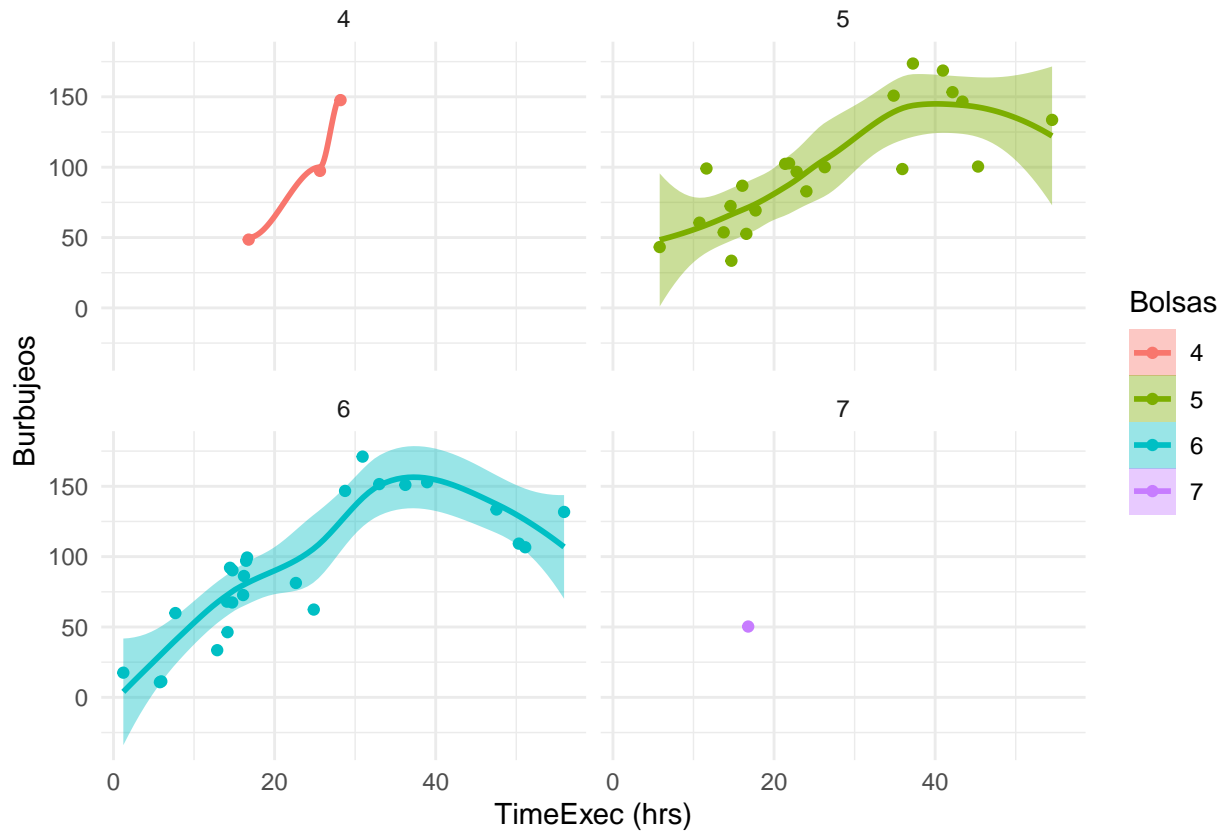
```
x <- db$M
y <- db$Burbujeos
z <- db$Bolsas
plot3D::scatter3D(x, y, z, theta = 0, phi = 25)
```



```
db %>%
  mutate(Bolsas = forcats::as_factor(Bolsas)) %>%
  ggplot(aes(x = `TimeExec (hrs)`,
    y = Burbujeos, fill = Bolsas, color = Bolsas)) +
```

```
geom_jitter() +
geom_smooth() +
theme_minimal() +
facet_wrap(nrow = 3, .~Bolsas)
```

```
## `geom_smooth()` using method = 'loess' and formula 'y ~ x'
```



```
db %>%
  mutate(Bolsas = forcats::as_factor(Bolsas)) %>%
  ggplot(aes(x = `TiempoXBurbujeo (min)`,
             y = Burbujeos, fill = Bolsas, color = Bolsas)) +
  geom_point() +
  theme_minimal() +
  geom_smooth() +
  facet_wrap(nrow = 3, .~Bolsas)
```

```
## `geom_smooth()` using method = 'loess' and formula 'y ~ x'
```

