

Supplementary Online File 3:
A comparison of COVID-19 outbreaks across US Combined
Statistical Areas using new methods for estimating R_0 and social
distancing behaviour

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1 Introduction

In this supplementary online file we report the results of the [NMB-DASA](#) web app fitting procedure, for each CSA that satisfied our criterion for the choice of day 0 (29 CSAs). Each CSA section shows:

- the 7-day lagged moving average of incidence cases for the first 30 days after day 0
- the error of the fit of the basic parameters for each of the 200 procedures. These basic parameters are the contact rate (k), initial contacted population (C_{init}), initial symptomatic infectious population (I_{init}) and the succumb period (p_{suc}).
- the histograms showing the distribution of the basic parameters and the selected 4-tuple

- the screenshot of the web app for the best fit (day 0-14)
- the error of the fit of the social distancing drivers for each of the 200 procedures. These social distancing (δ_{sod}) drivers are onset time, and the initial and final social distancing rates, as well as the switching time location.
- the histograms showing the distribution of the social distancing driver parameters and the selected 4-tuple
- the screenshot of the web app for the best fit (day 0-30)
- the mean and standard deviation of the curve flattening index (considering the best 20 fits)
- a table reporting the parameters (basic and social distancing) which gave the best fit for the two procedures (basic: day 0-14 and social distancing: day 0-30)

2 Atlanta, Athens, Clarke County, Sandy Springs, GA, AL

We analyse the 7-day lagged moving average of the incidence cases and chose day 41 of data collection as "day 0".

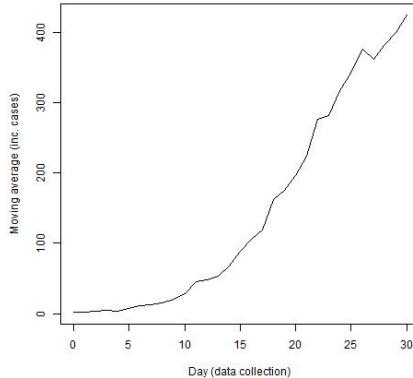


Figure 1: Incidence cases, day 0-30.

We performed the fit of the 4 basic parameters (k , C_{init} , I_{init} , p_{suc}) using the WebApp, for 200 times. The errors of the fit result as follows:

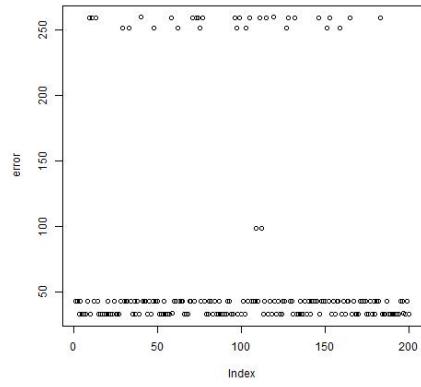


Figure 2: Error for each procedure

Excluding the highest errors (above 20000), we considered the values of the 4 basic parameters and look at their distributions:

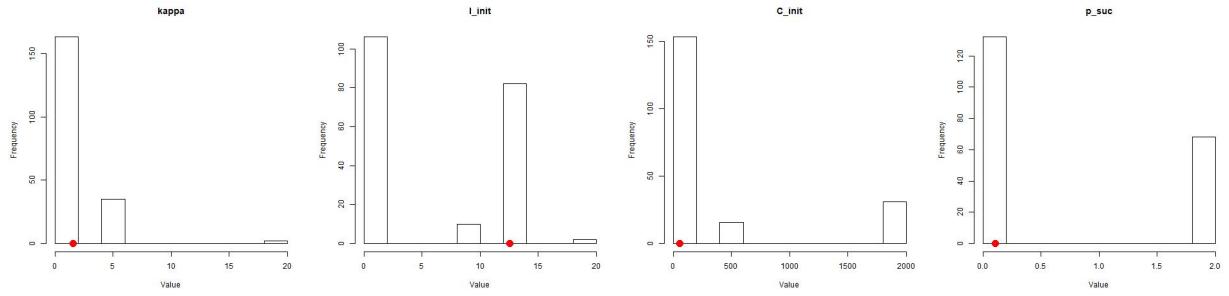


Figure 3: Distribution of 4 basic parameters (selected 4-tuple in red)

We fix the 4 basic parameters which gave the least error.



Figure 4: Screenshot of the WebApp for the best fit.

and we then move on to fit the 4 parameters of social distancing driver:

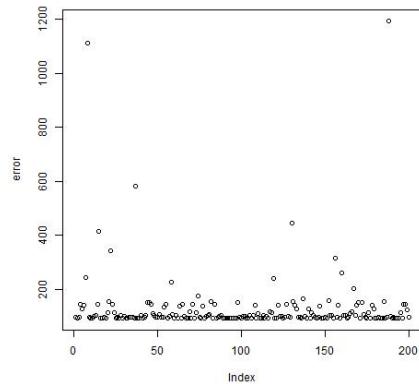


Figure 5: Error of phase 2 fit

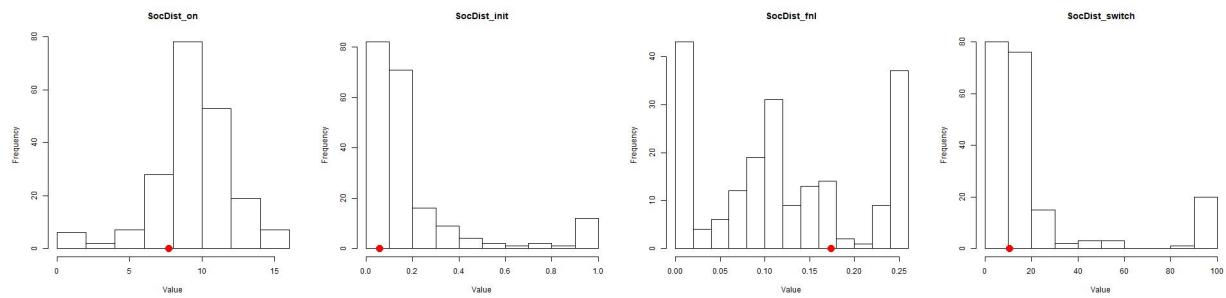


Figure 6: Distribution of parameters of social distancing driver (selected 4-tuple in red)

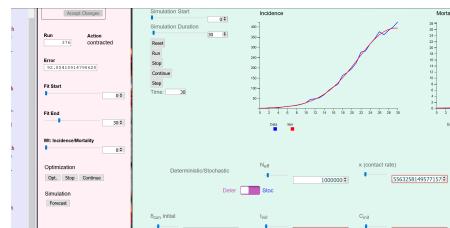


Figure 7: Screenshot of the WebApp for the best fit.

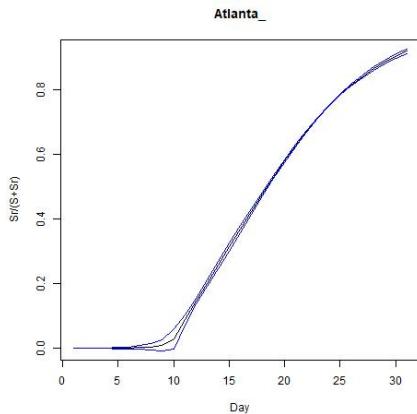


Figure 8: Curve flattening index (best 20 fits).

Parameters:

k	c	i	p
1.556326	54.92472	12.55604	0.106392
socDist_on	socDist_in	socDist_fnl	socDist_switch
7.710877	0.057856	0.173711	10.57075

3 Boston, Worcester, Providence, MA, RI, NH, CT

We analyse the 7-day lagged moving average of the incidence cases and chose day 49 of data collection as "day 0".

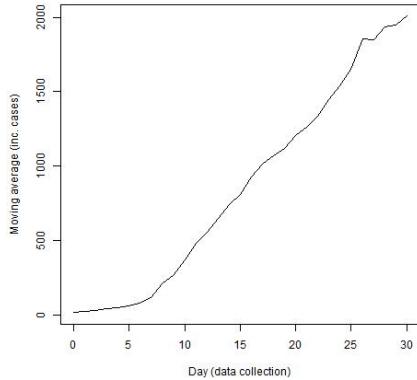


Figure 9: Incidence cases, day 0-30.

We performed the fit of the 4 basic parameters (k , C_{init} , I_{init} , p_{suc}) using the WebApp, for 200 times. The errors of the fit result as follows:

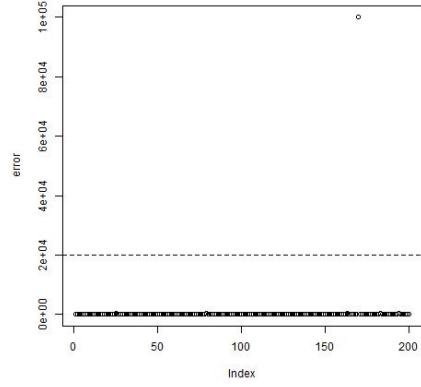


Figure 10: Error for each procedure

Note: when the fitting yielded infinite error, we changed it into 10^5 to represent a value in the figure.

Excluding the highest errors (above 20000), we considered the values of the 4 basic parameters and look at their distributions:

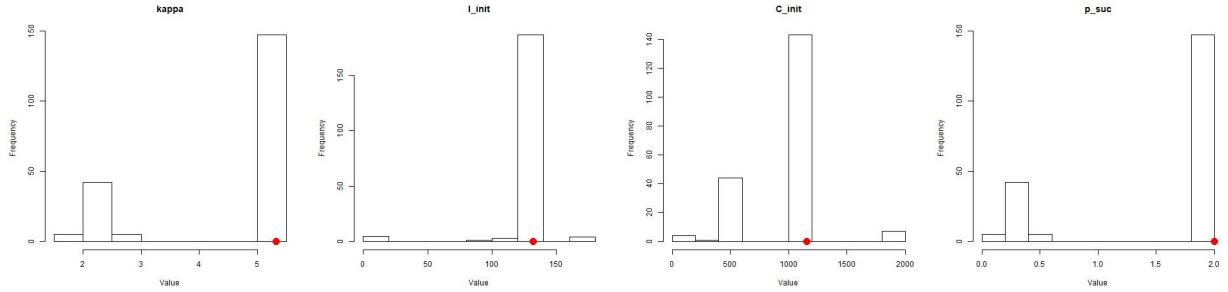


Figure 11: Distribution of 4 basic parameters (selected 4-tuple in red)

We fix the 4 basic parameters which gave the least error.

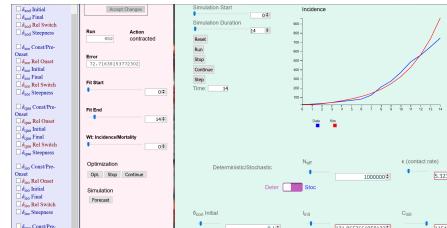


Figure 12: Screenshot of the WebApp for the best fit.

and we then move on to fit the 4 parameters of social distancing driver:

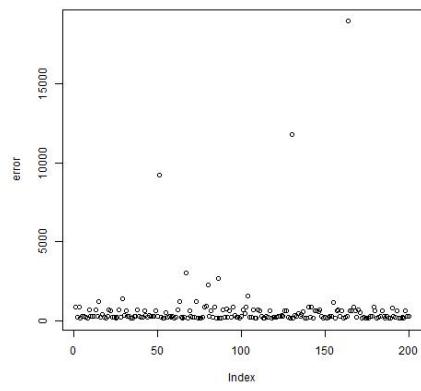


Figure 13: Error of phase 2 fit

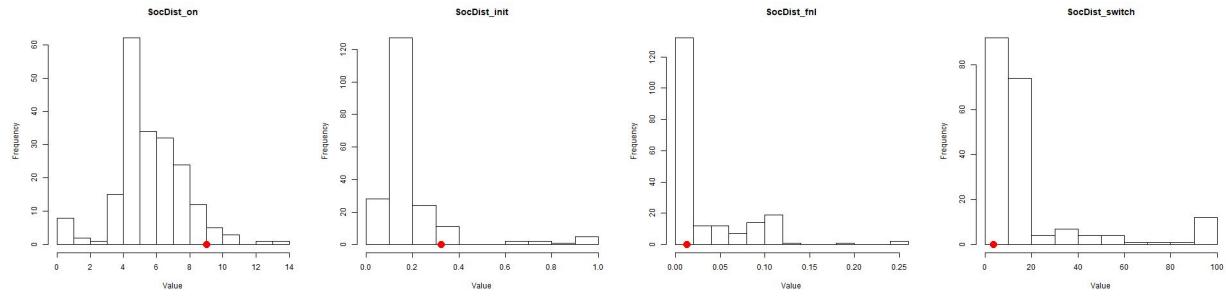


Figure 14: Distribution of parameters of social distancing driver (selected 4-tuple in red)

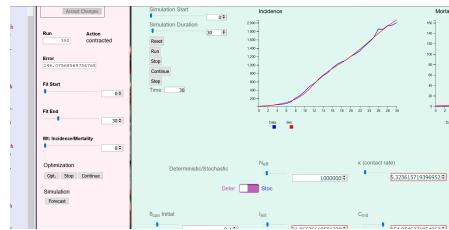


Figure 15: Screenshot of the WebApp for the best fit.

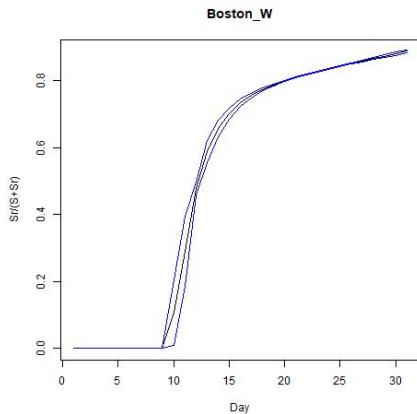


Figure 16: Curve flattening index (best 20 fits).

Parameters:

k	c	i	p
5.323616	1154.955	131.8653	2
socDist_on	socDist_in	socDist_fnl	socDist_switch
9	0.322965	0.012845	3.519949

4 Brownsville, Harlingen, Raymondville, TX

We analyse the 7-day lagged moving average of the incidence cases and chose day 56 of data collection as "day 0".

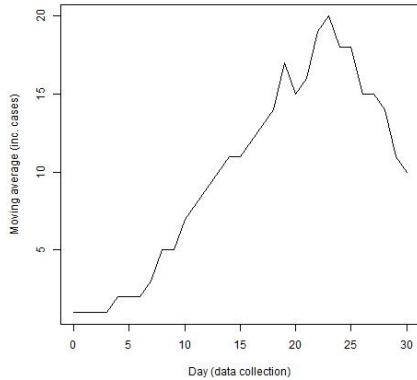


Figure 17: Incidence cases, day 0-30.

We performed the fit of the 4 basic parameters (k , C_{init} , I_{init} , p_{suc}) using the WebApp, for 200 times. The errors of the fit result as follows:

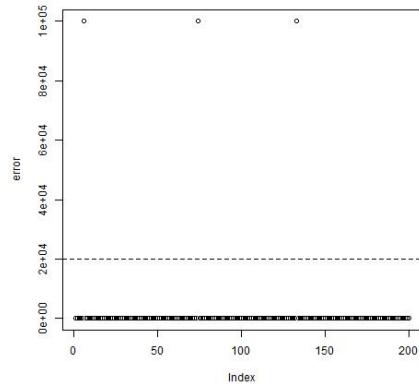


Figure 18: Error for each procedure

Excluding the highest errors (above 20000), we considered the values of the 4 basic parameters and look at their distributions:

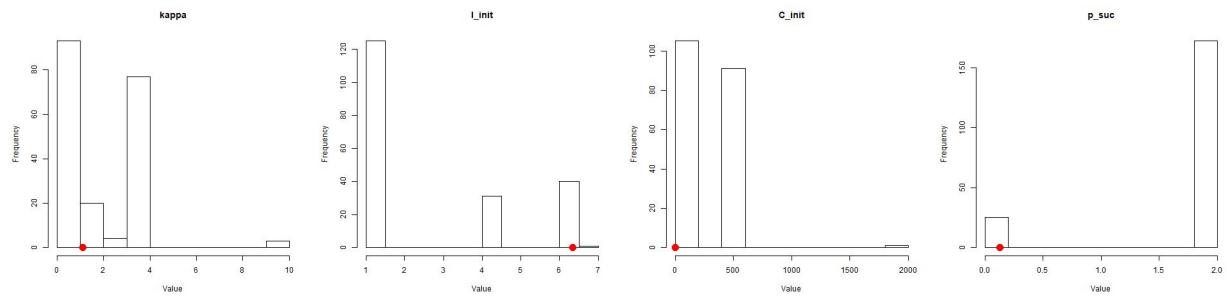


Figure 19: Distribution of 4 basic parameters (selected 4-tuple in red)

We fix the 4 basic parameters which gave the least error.

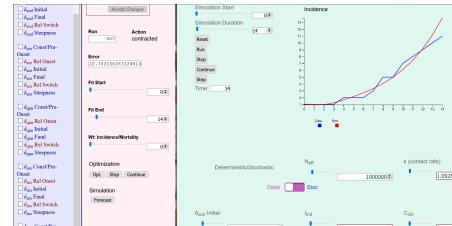


Figure 20: Screenshot of the WebApp for the best fit.

and we then move on to fit the 4 parameters of social distancing driver:

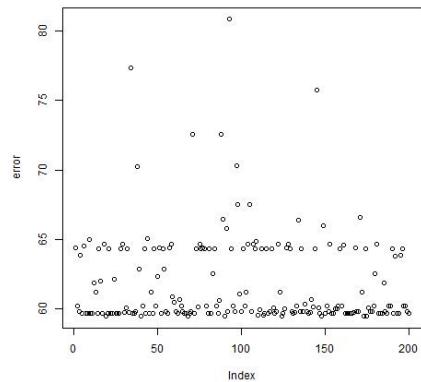


Figure 21: Error of phase 2 fit

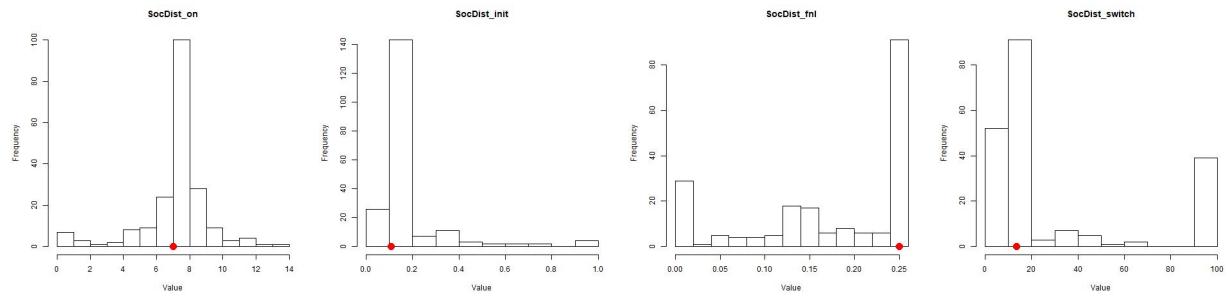


Figure 22: Distribution of parameters of social distancing driver (selected 4-tuple in red)

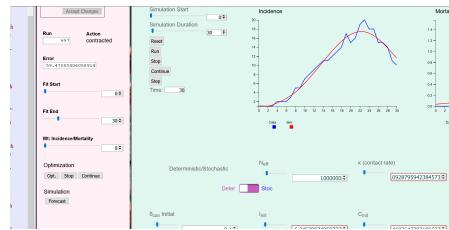


Figure 23: Screenshot of the WebApp for the best fit.

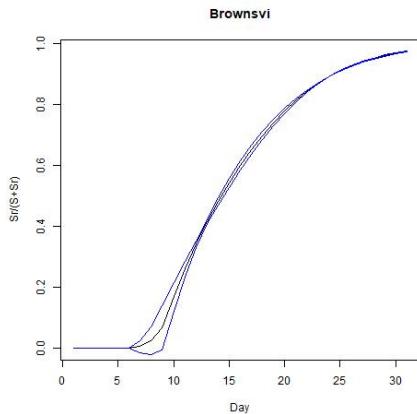


Figure 24: Curve flattening index (best 20 fits).

Parameters:

k	c	i	p
1.09288	2.468365	6.345299	0.124575
socDist_on	socDist_in	socDist_fnl	socDist_switch
7	0.10839	0.25	13.50671

5 Cape Coral, Fort Myers, Naples, FL

We analyse the 7-day lagged moving average of the incidence cases and chose day 50 of data collection as "day 0".

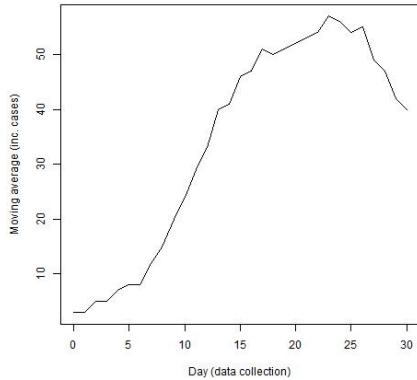


Figure 25: Incidence cases, day 0-30.

We performed the fit of the 4 basic parameters (k , C_{init} , I_{init} , p_{suc}) using the WebApp, for 200 times. The errors of the fit result as follows:

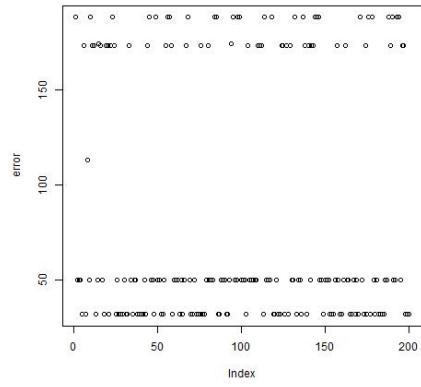


Figure 26: Error for each procedure

Excluding the highest errors (above 20000), we considered the values of the 4 basic parameters and look at their distributions:

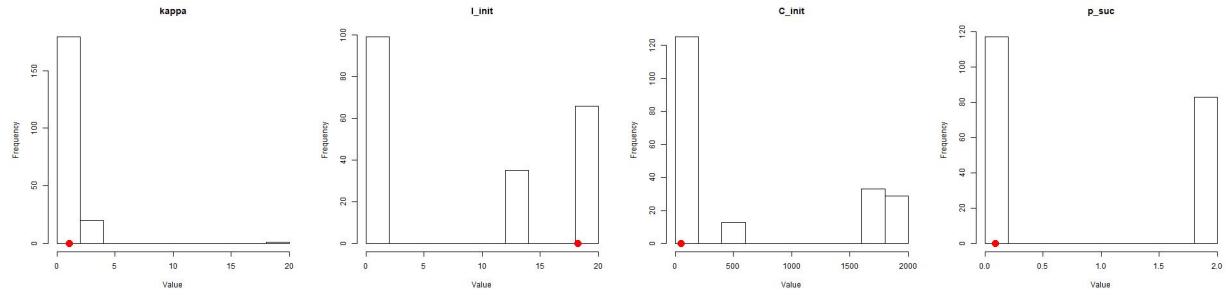


Figure 27: Distribution of 4 basic parameters (selected 4-tuple in red)

We fix the 4 basic parameters which gave the least error.

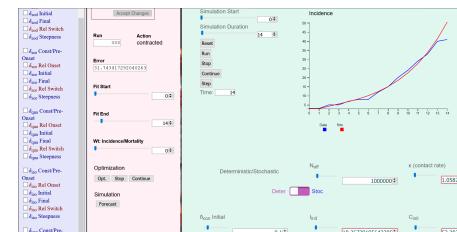


Figure 28: Screenshot of the WebApp for the best fit.

and we then move on to fit the 4 parameters of social distancing driver:

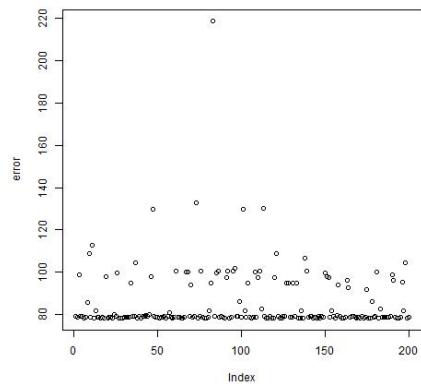


Figure 29: Error of phase 2 fit

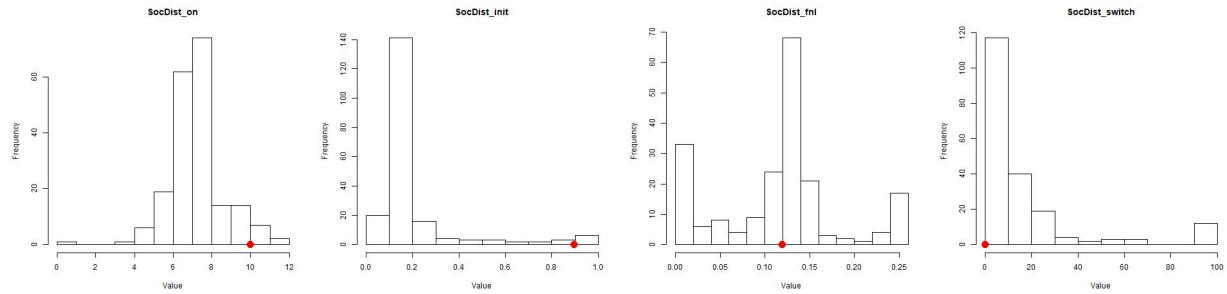


Figure 30: Distribution of parameters of social distancing driver (selected 4-tuple in red)

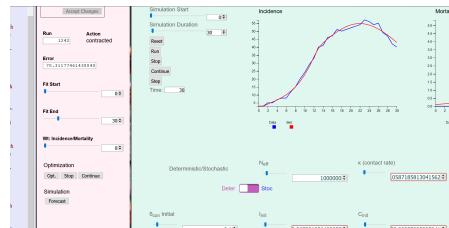


Figure 31: Screenshot of the WebApp for the best fit.

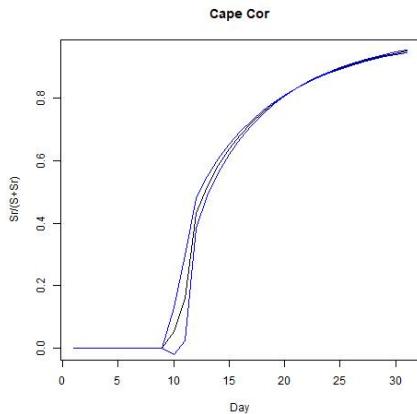


Figure 32: Curve flattening index (best 20 fits).

Parameters:

k	c	i	p
1.058719	52.38258	18.26729	0.08789
socDist_on	socDist_in	socDist_fnl	socDist_switch
9.999306	0.896865	0.119422	0.000964

6 Chicago, Naperville, IL, IN, WI

We analyse the 7-day lagged moving average of the incidence cases and chose day 40 of data collection as "day 0".

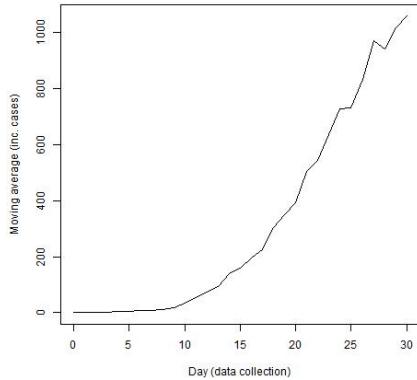


Figure 33: Incidence cases, day 0-30.

We performed the fit of the 4 basic parameters (k , C_{init} , I_{init} , p_{suc}) using the WebApp, for 200 times. The errors of the fit result as follows:

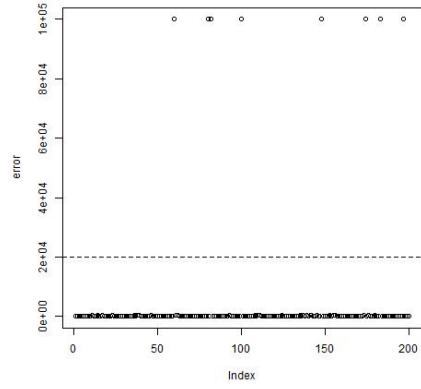


Figure 34: Error for each procedure

Excluding the highest errors (above 20000), we considered the values of the 4 basic parameters and look at their distributions:

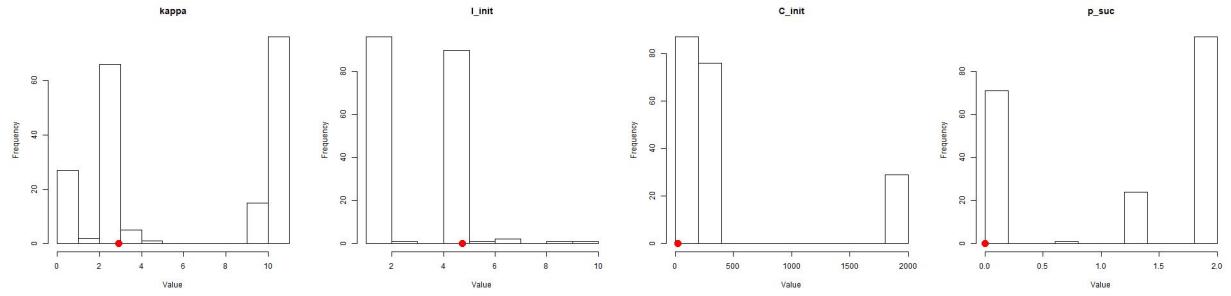


Figure 35: Distribution of 4 basic parameters (selected 4-tuple in red)

We fix the 4 basic parameters which gave the least error.

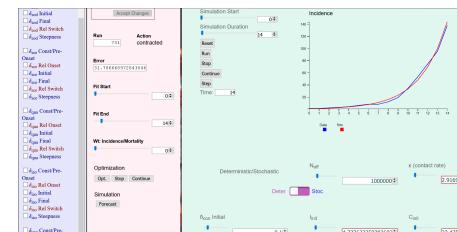


Figure 36: Screenshot of the WebApp for the best fit.

and we then move on to fit the 4 parameters of social distancing driver:

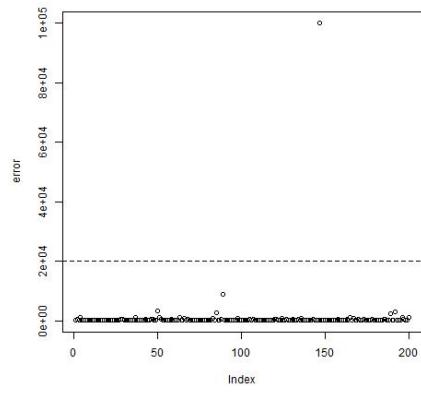


Figure 37: Error of phase 2 fit

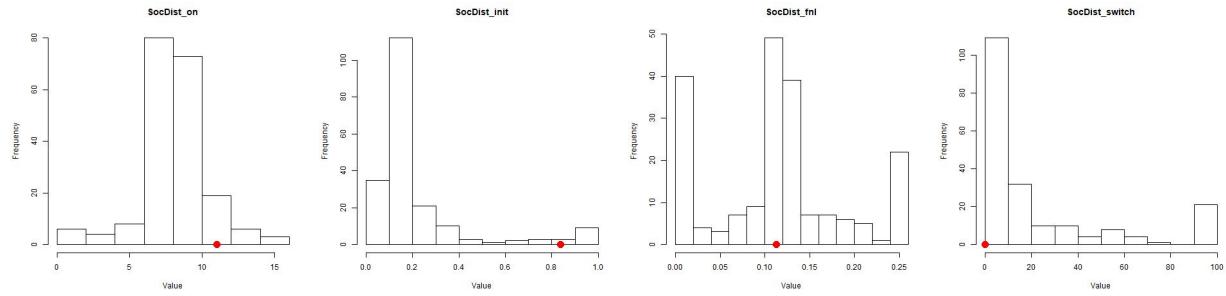


Figure 38: Distribution of parameters of social distancing driver (selected 4-tuple in red)

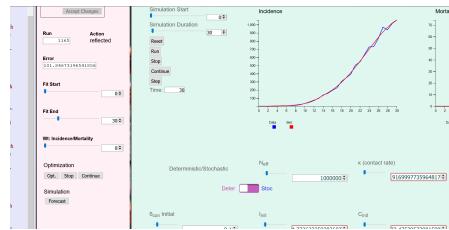


Figure 39: Screenshot of the WebApp for the best fit.

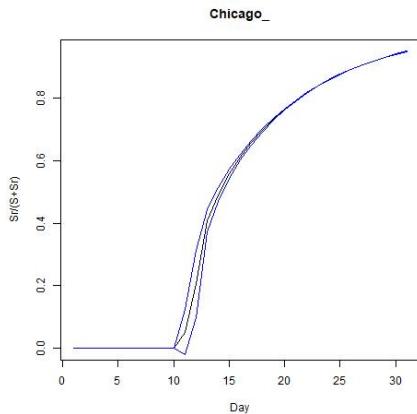


Figure 40: Curve flattening index (best 20 fits).

Parameters:

k	c	i	p
2.917	23.4754	4.732622	1.37E-09
socDist_on	socDist_in	socDist_fnl	socDist_switch
10.99764	0.837874	0.112597	0.00328

7 Columbia, Orangeburg, Newberry, SC

We analyse the 7-day lagged moving average of the incidence cases and chose day 43 of data collection as "day 0".

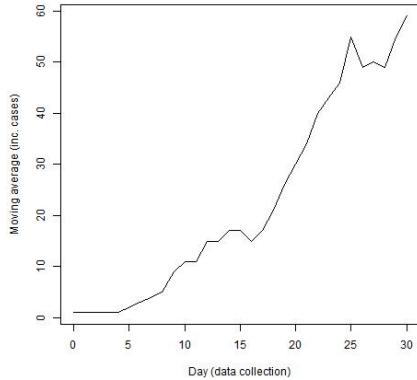


Figure 41: Incidence cases, day 0-30.

We performed the fit of the 4 basic parameters (k , C_{init} , I_{init} , p_{suc}) using the WebApp, for 200 times. The errors of the fit result as follows:

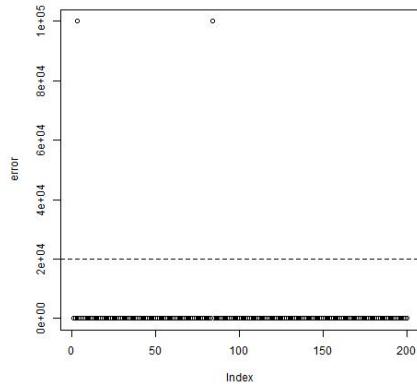


Figure 42: Error for each procedure

Excluding the highest errors (above 20000), we considered the values of the 4 basic parameters and look at their distributions:

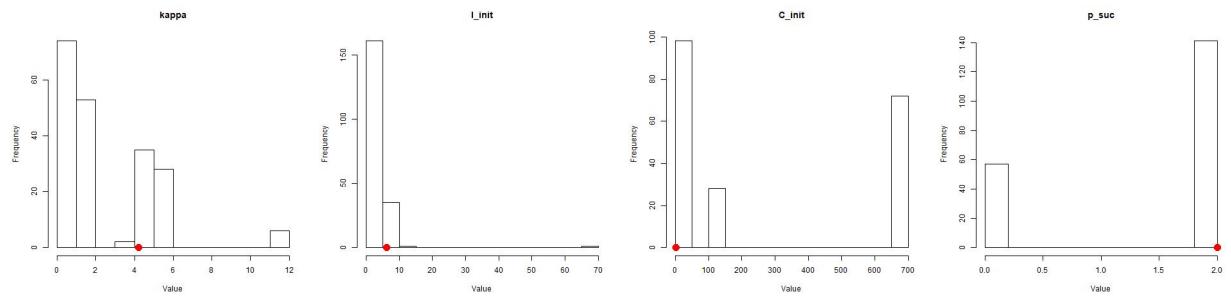


Figure 43: Distribution of 4 basic parameters (selected 4-tuple in red)

We fix the 4 basic parameters which gave the least error.

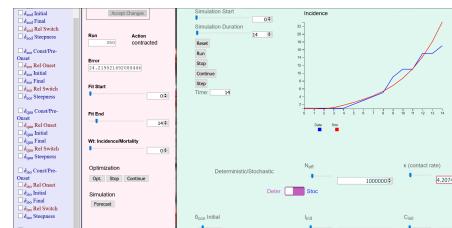


Figure 44: Screenshot of the WebApp for the best fit.

and we then move on to fit the 4 parameters of social distancing driver:

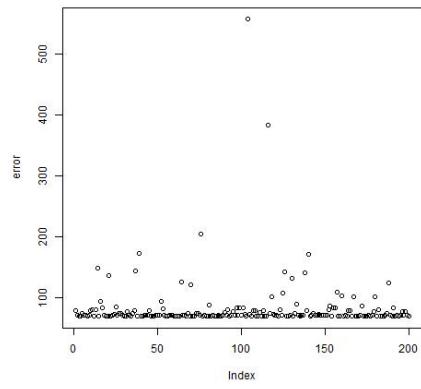


Figure 45: Error of phase 2 fit

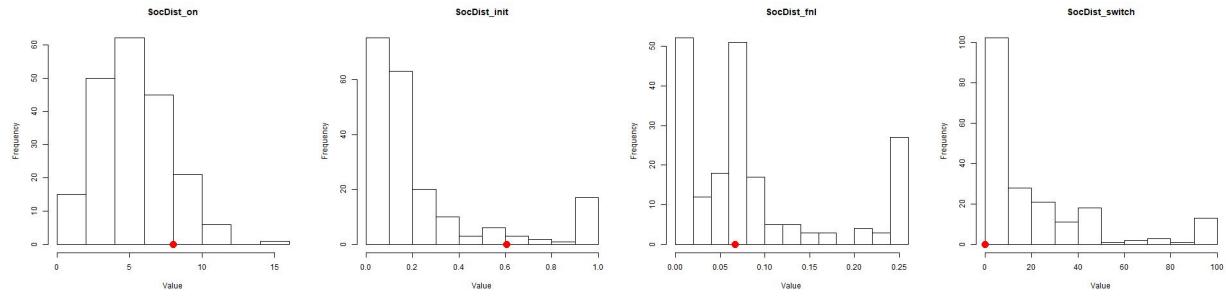


Figure 46: Distribution of parameters of social distancing driver (selected 4-tuple in red)

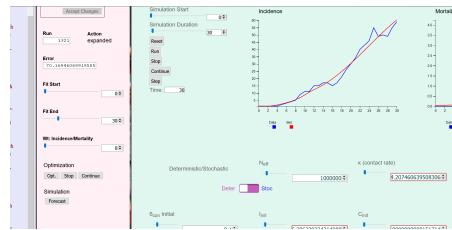


Figure 47: Screenshot of the WebApp for the best fit.

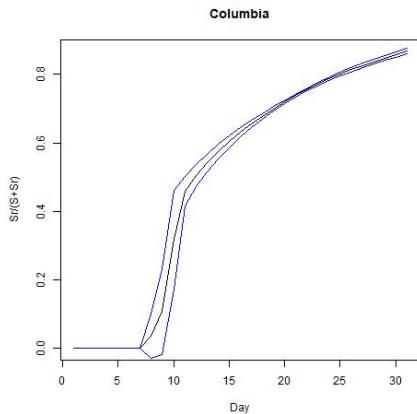


Figure 48: Curve flattening index (best 20 fits).

Parameters:

k	c	i	p
4.207461	1	6.286239	2
socDist_on	socDist_in	socDist_fnl	socDist_switch
7.998995	0.604486	0.066893	0.00335

8 Denver, Aurora, CO

We analyse the 7-day lagged moving average of the incidence cases and chose day 41 of data collection as "day 0".

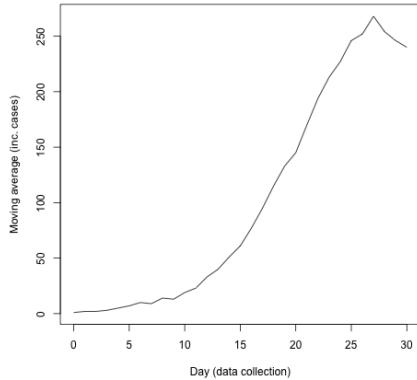


Figure 49: Incidence cases, day 0-30.

We performed the fit of the 4 basic parameters (k , C_{init} , I_{init} , p_suc) using the WebApp, for 200 times. The errors of the fit result as follows:

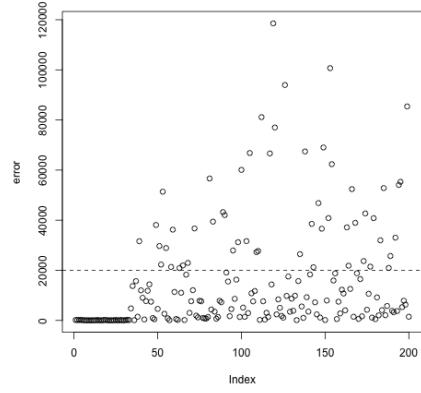


Figure 50: Error for each procedure

Excluding the highest errors (above 20000), we considered the values of the 4 basic parameters and look at their distributions:

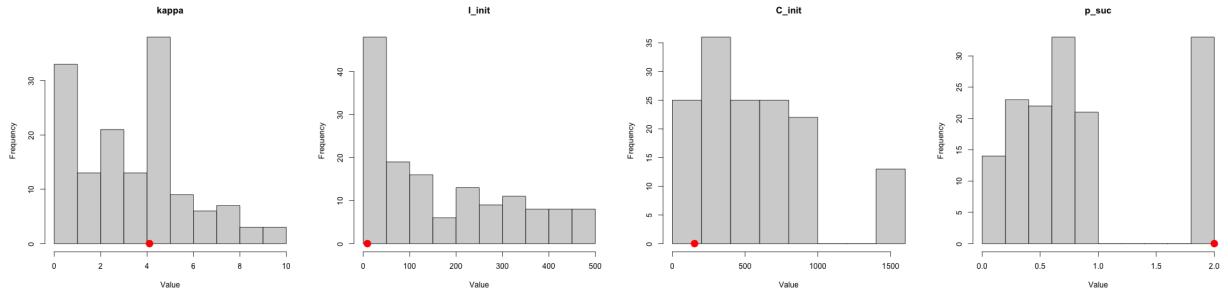


Figure 51: Distribution of 4 basic parameters (selected 4-tuple in red)

We fix the 4 basic parameters which gave the least error.



Figure 52: Screenshot of the WebApp for the best fit.

and we then move on to fit the 4 parameters of social distancing driver:

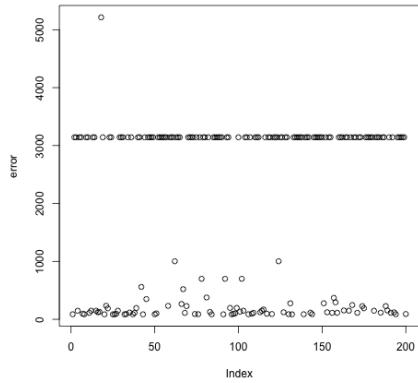


Figure 53: Error of phase 2 fit

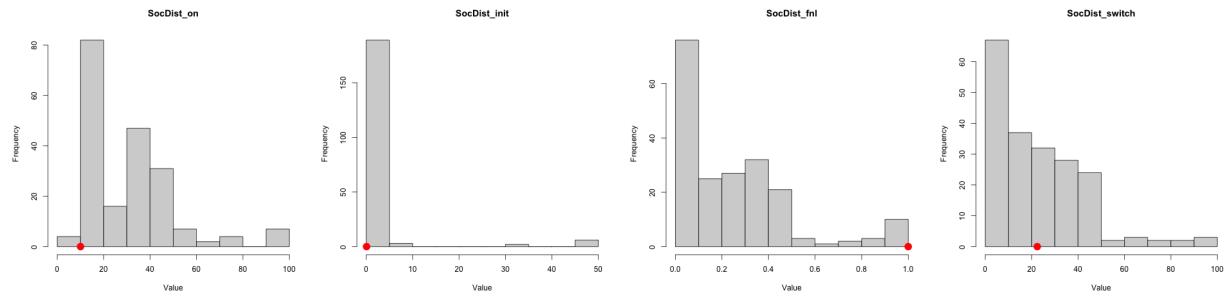


Figure 54: Distribution of parameters of social distancing driver (selected 4-tuple in red)



Figure 55: Screenshot of the WebApp for the best fit.

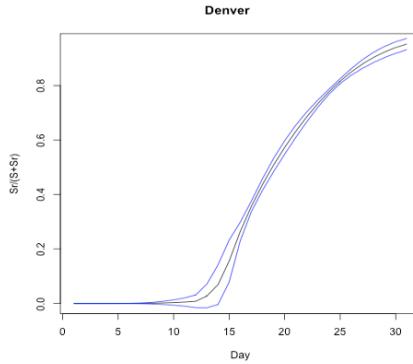


Figure 56: Curve flattening index (best 20 fits).

Parameters:

k	c	i	p
4.10852068363966	152.677641235811	9.11764150945729	2
socDist_on	socDist_in	socDist_fnl	socDist_switch
10.0529237028016	0.0857192526794046	1	22.4458592096396

9 Detroit, Warren, Ann Arbor, MI

We analyse the 7-day lagged moving average of the incidence cases and chose day 50 of data collection as "day 0".

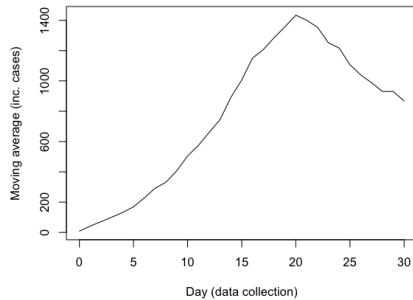


Figure 57: Incidence cases, day 0-30.

We performed the fit of the 4 basic parameters (k , C_{init} , I_{init} , p_{suc}) using the WebApp, for 200 times. The errors of the fit result as follows:

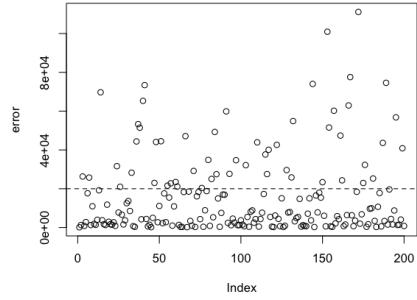


Figure 58: Error for each procedure

Excluding the highest errors (above 20000), we considered the values of the 4 basic parameters and look at their distributions:

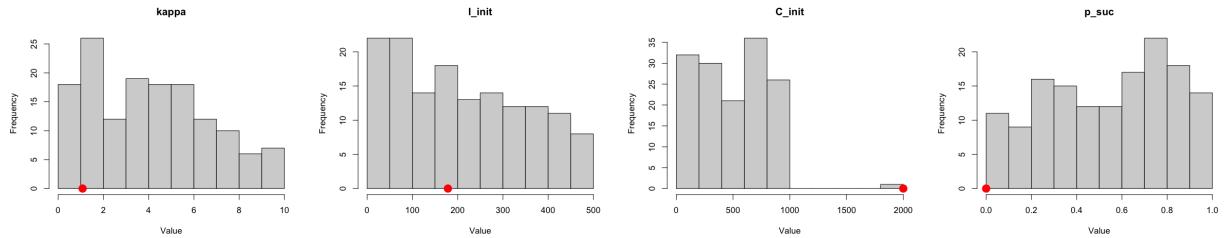


Figure 59: Distribution of 4 basic parameters (selected 4-tuple in red)

We fix the 4 basic parameters which gave the least error.

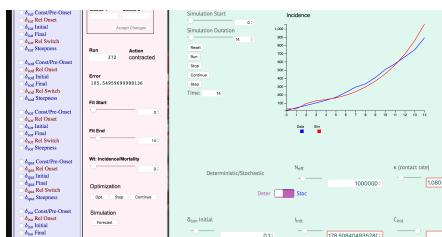


Figure 60: Screenshot of the WebApp for the best fit.

and we then move on to fit the 4 parameters of social distancing driver:

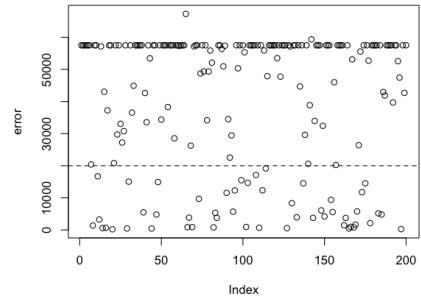


Figure 61: Error of phase 2 fit

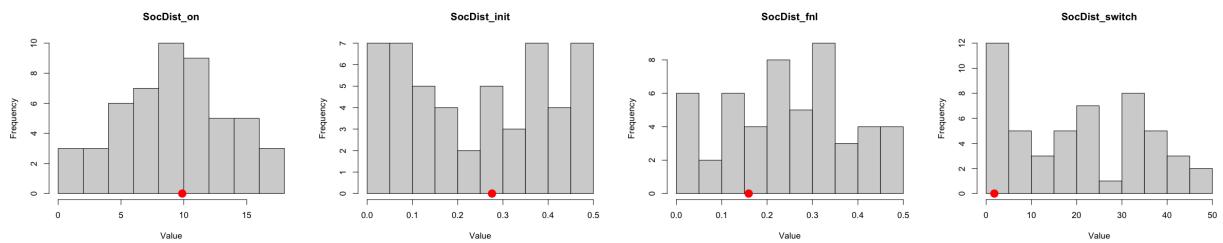


Figure 62: Distribution of parameters of social distancing driver (selected 4-tuple in red)



Figure 63: Screenshot of the WebApp for the best fit.

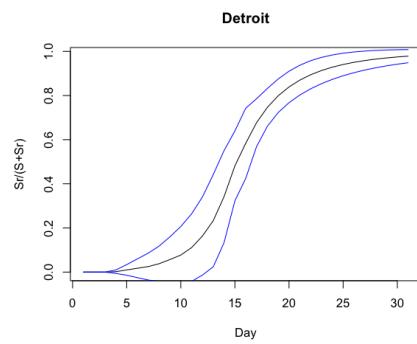


Figure 64: Curve flattening index (best 20 fits).

Parameters:

k	c	i	p
1.080591528120610	2000	178.50840493528000	9.138700602363E-13
socDist_on	socDist_in	socDist_fnl	socDist_switch
9.87498197231093	0.27600430430138500	0.1594469955506270	1.810086943094490

10 Greenville, Spartanburg, Anderson, SC

We analyse the 7-day lagged moving average of the incidence cases and chose day 50 of data collection as "day 0".

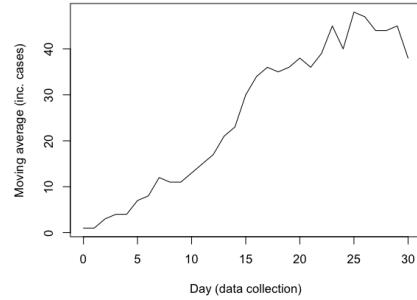


Figure 65: Incidence cases, day 0-30.

We performed the fit of the 4 basic parameters (k , C_{init} , I_{init} , p_{suc}) using the WebApp, for 200 times. The errors of the fit result as follows:

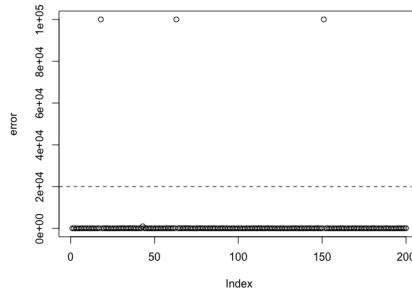


Figure 66: Error for each procedure

Excluding the highest errors (above 20000), we considered the values of the 4 basic parameters and look at their distributions:

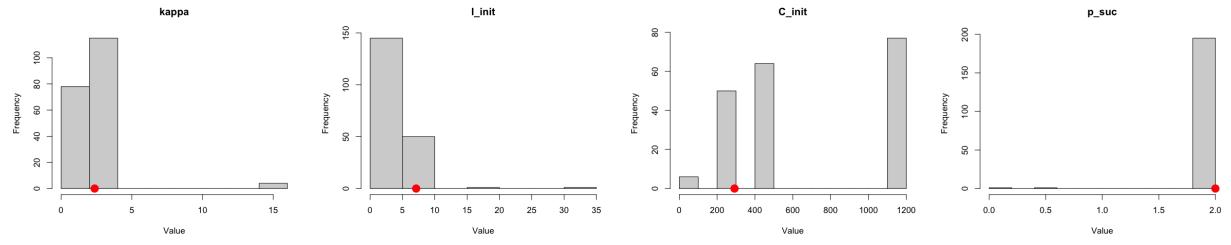


Figure 67: Distribution of 4 basic parameters (selected 4-tuple in red)

We fix the 4 basic parameters which gave the least error.

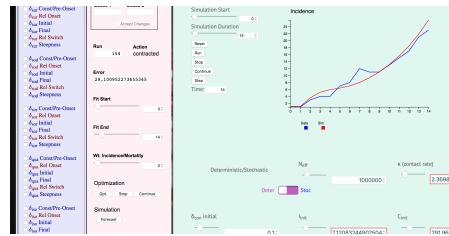


Figure 68: Screenshot of the WebApp for the best fit.

and we then move on to fit the 4 parameters of social distancing driver:

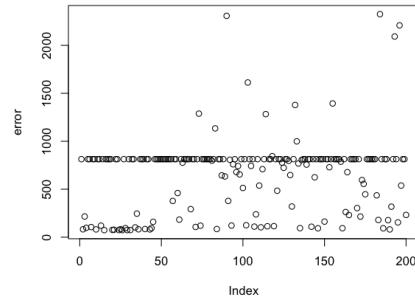


Figure 69: Error of phase 2 fit

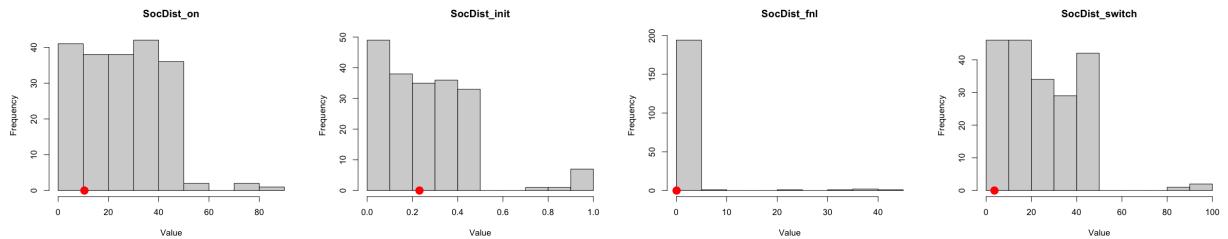


Figure 70: Distribution of parameters of social distancing driver (selected 4-tuple in red)

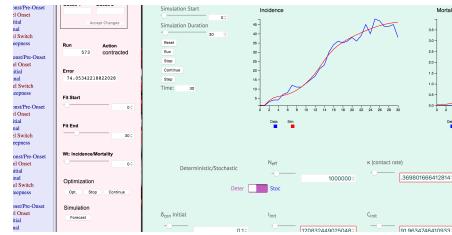


Figure 71: Screenshot of the WebApp for the best fit.

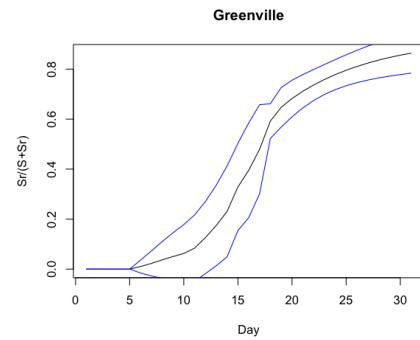


Figure 72: Curve flattening index (best 20 fits).

Parameters:

k	c	i	p
2.3698016666412810	291.9634746410930	7.120832449025050	2
Parameters:			
socDist_on	socDist_in	socDist_fnl	socDist_switch
10.450207199448600	0.2313247418806880	0.05584567868678010	3.672556263023720

11 Hartford, East Hartford, CT

We analyse the 7-day lagged moving average of the incidence cases and chose day 49 of data collection as "day 0".

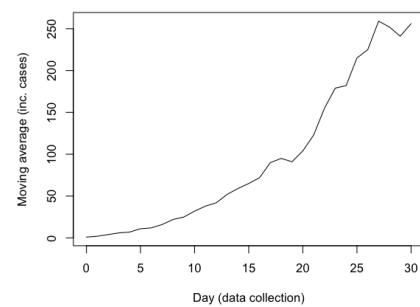


Figure 73: Incidence cases, day 0-30.

We performed the fit of the 4 basic parameters (k , C_{init} , I_{limit} , p_{suc}) using the WebApp, for 200 times. The errors of the fit result as follows:

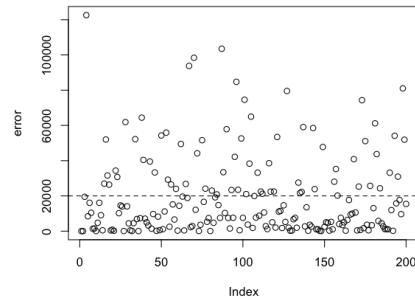


Figure 74: Error for each procedure

Excluding the highest errors (above 20000), we considered the values of the 4 basic parameters and look at their distributions:

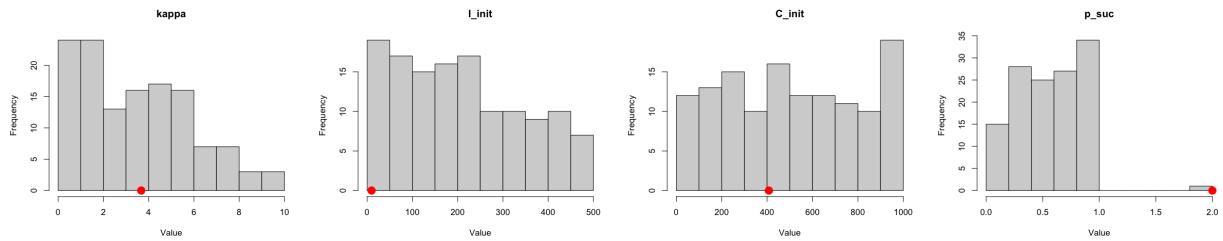


Figure 75: Distribution of 4 basic parameters (selected 4-tuple in red)

We fix the 4 basic parameters which gave the least error.



Figure 76: Screenshot of the WebApp for the best fit.

and we then move on to fit the 4 parameters of social distancing driver:

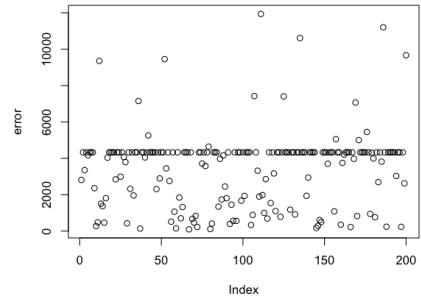


Figure 77: Error of phase 2 fit

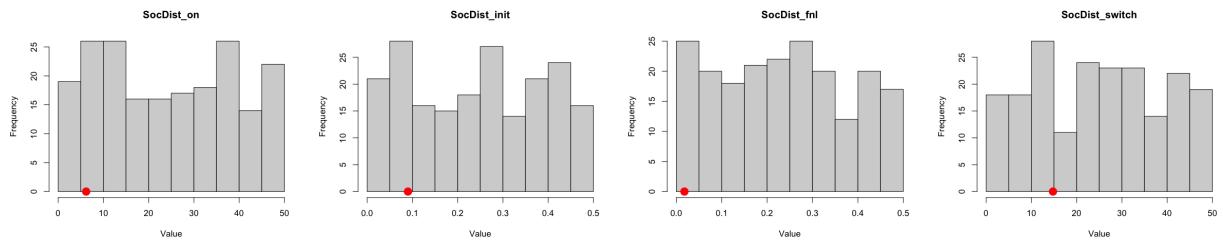


Figure 78: Distribution of parameters of social distancing driver (selected 4-tuple in red)

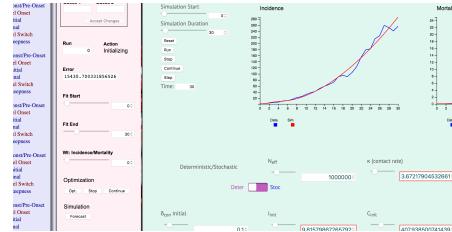


Figure 79: Screenshot of the WebApp for the best fit.

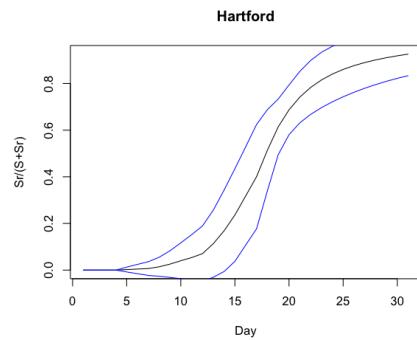


Figure 80: Curve flattening index (best 20 fits).

Parameters:

k	c	i	p
3.67217904532661	407.93850074143900	9.815798672657920	2
socDist_on	socDist_in	socDist_fnl	socDist_switch
6.187061186574440	0.09021229603206470	0.017915974405481400	14.773081024544300

12 Houston, The Woodlands, TX

We analyse the 7-day lagged moving average of the incidence cases and chose day 48 of data collection as "day 0".

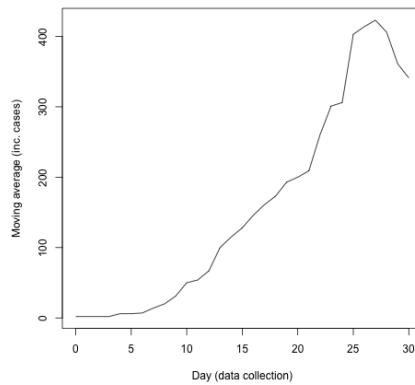


Figure 81: Incidence cases, day 0-30.

We performed the fit of the 4 basic parameters (k , C_{init} , I_{init} , p_{suc}) using the WebApp, for 200 times. The errors of the fit result as follows:

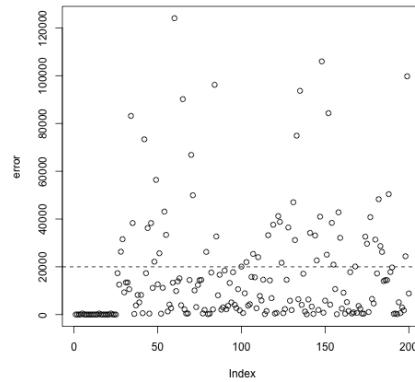


Figure 82: Error for each procedure

Excluding the highest errors (above 20000), we considered the values of the 4 basic parameters and look at their distributions:

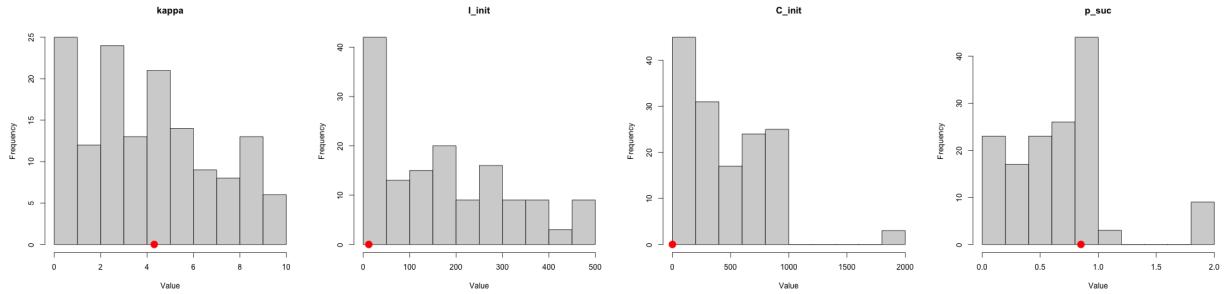


Figure 83: Distribution of 4 basic parameters (selected 4-tuple in red)

We fix the 4 basic parameters which gave the least error.

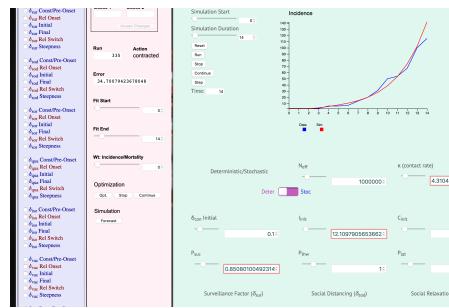


Figure 84: Screenshot of the WebApp for the best fit.

and we then move on to fit the 4 parameters of social distancing driver:

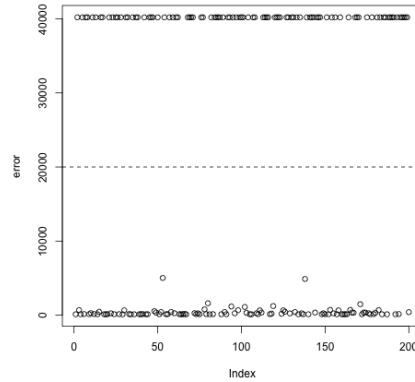


Figure 85: Error of phase 2 fit

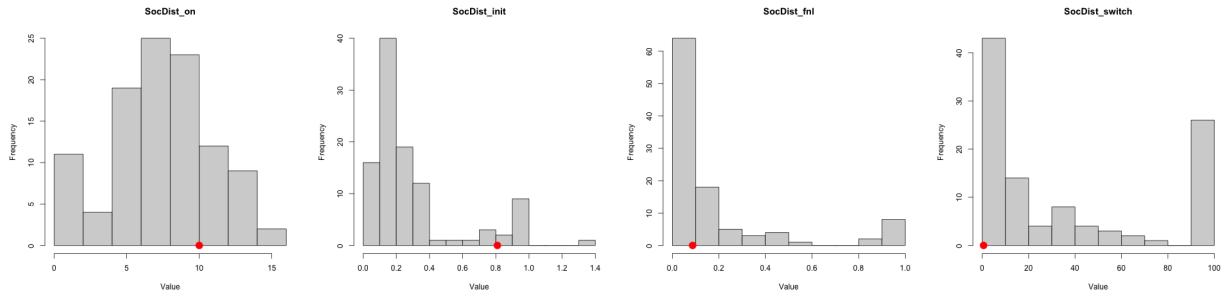


Figure 86: Distribution of parameters of social distancing driver (selected 4-tuple in red)



Figure 87: Screenshot of the WebApp for the best fit.

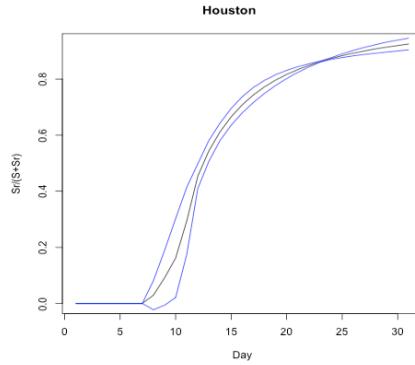


Figure 88: Curve flattening index (best 20 fits).

Parameters:

k	c	i	p
4.3104142803833	1	12.1097905653663	0.850801004923142
socDist_on	socDist_in	socDist_fnl	socDist_switch
9.99999999986308	0.809497605746915	0.0871163273847117	0.610284895130456

13 Indianapolis, Carmel, Muncie, IN

We analyse the 7-day lagged moving average of the incidence cases and chose day 47 of data collection as "day 0".

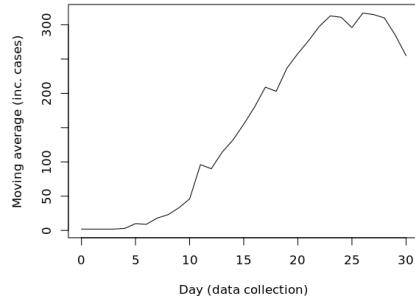


Figure 89: Incidence cases, day 0-30.

We performed the fit of the 4 basic parameters (k , C_{init} , I_{init} , p_{suc}) using the WebApp, for 200 times. The errors of the fit result as follows:

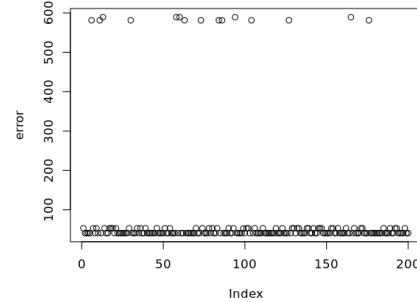


Figure 90: Error for each procedure

Excluding the highest errors (above 20000), we considered the values of the 4 basic parameters and look at their distributions:

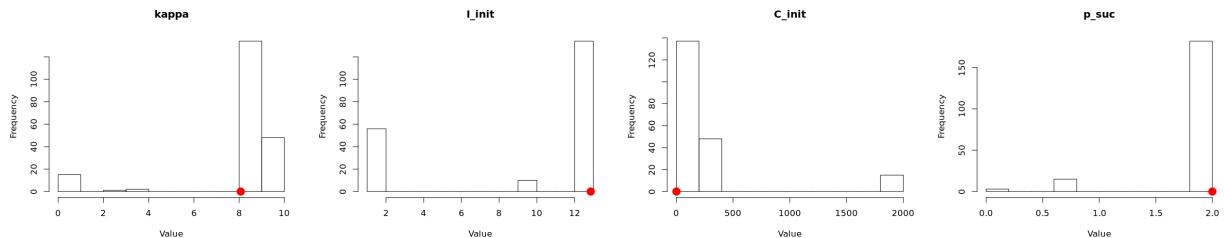


Figure 91: Distribution of 4 basic parameters (selected 4-tuple in red)

We fix the 4 basic parameters which gave the least error.



Figure 92: Screenshot of the WebApp for the best fit.

and we then move on to fit the 4 parameters of social distancing driver:

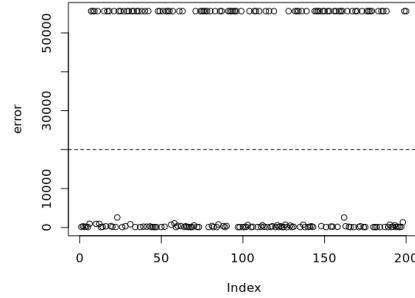


Figure 93: Error of phase 2 fit

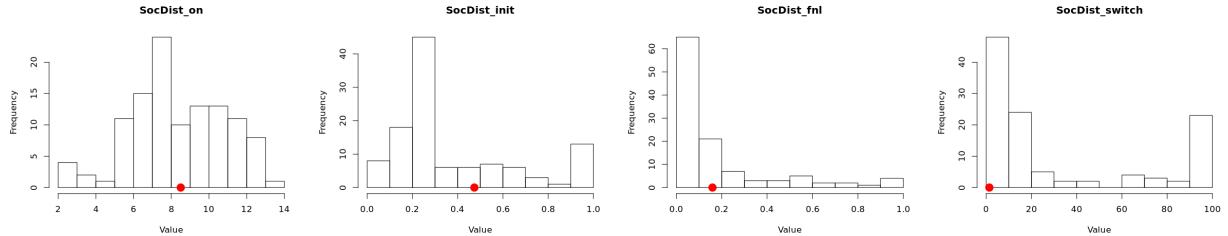


Figure 94: Distribution of parameters of social distancing driver (selected 4-tuple in red)

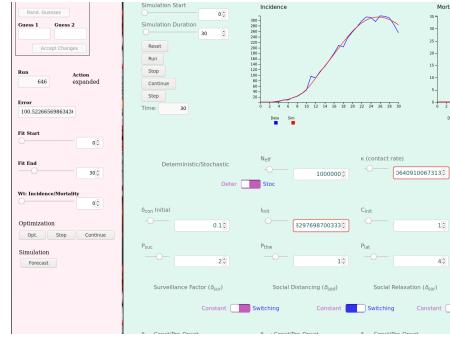


Figure 95: Screenshot of the WebApp for the best fit.

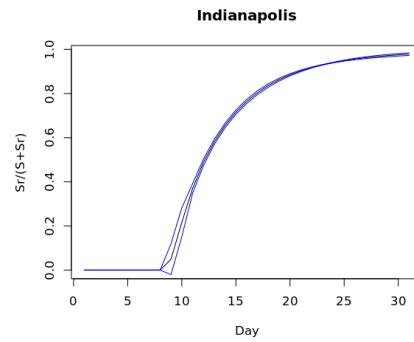


Figure 96: Curve flattening index (best 20 fits).

Parameters:

k	c	i	p
8.070640910067310	1	12.8558297698700300	2
socDist_on	socDist_in	socDist_fnl	socDist_switch
8.503862107387020	0.4739607017502820	0.15944994264969000	1.421562909186690

14 Jackson, Vicksburg, Brookhaven, MS

We analyse the 7-day lagged moving average of the incidence cases and chose day 46 of data collection as "day 0".

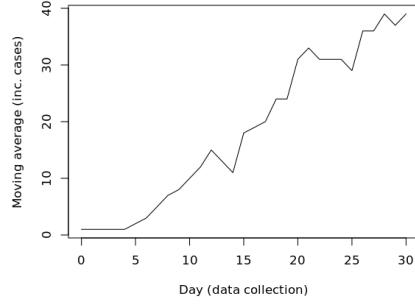


Figure 97: Incidence cases, day 0-30.

We performed the fit of the 4 basic parameters (k , C_{init} , I_{init} , p_{suc}) using the WebApp, for 200 times. The errors of the fit result as follows:

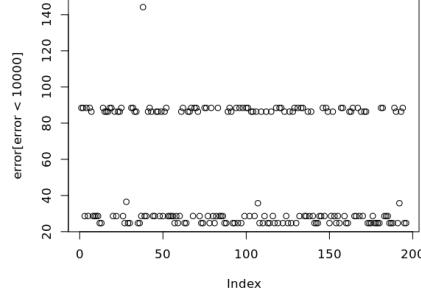


Figure 98: Error for each procedure

Excluding the highest errors (above 20000), we considered the values of the 4 basic parameters and look at their distributions:

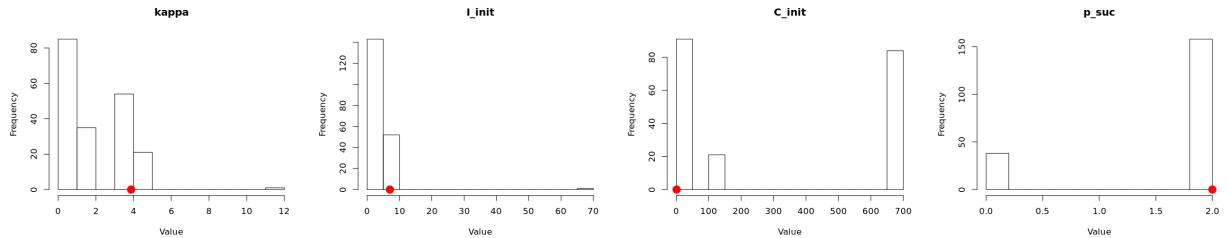


Figure 99: Distribution of 4 basic parameters (selected 4-tuple in red)

We fix the 4 basic parameters which gave the least error.



Figure 100: Screenshot of the WebApp for the best fit.

and we then move on to fit the 4 parameters of social distancing driver:

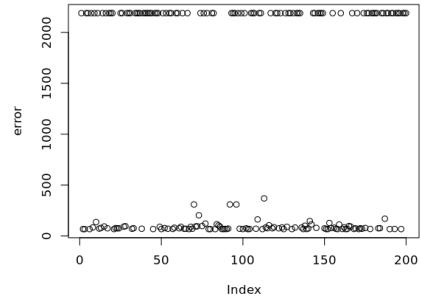


Figure 101: Error of phase 2 fit

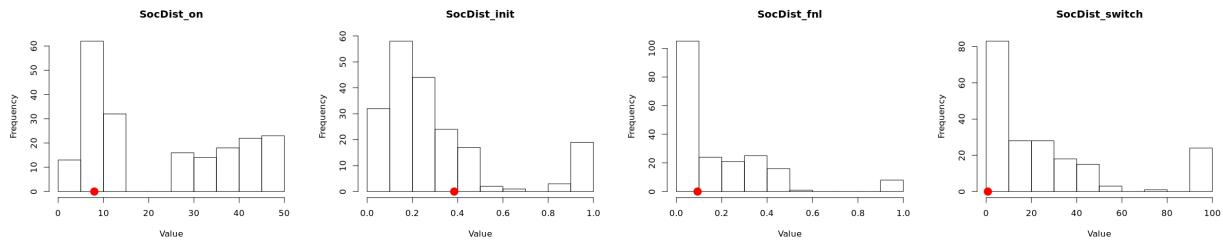


Figure 102: Distribution of parameters of social distancing driver (selected 4-tuple in red)

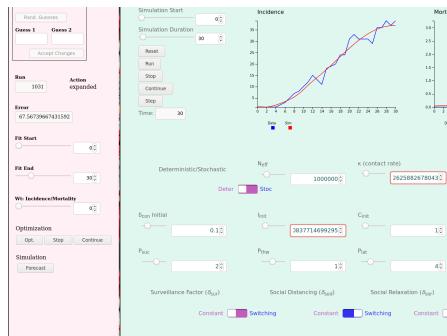


Figure 103: Screenshot of the WebApp for the best fit.

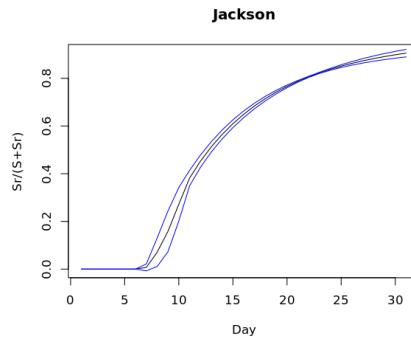


Figure 104: Curve flattening index (best 20 fits).

Parameters:

k	c	i	p
3.872625882678040	1	7.040837714699300	2
socDist_on	socDist_in	socDist_fnl	socDist_switch
7.99999999981450	0.38495554395357200	0.09374749240141520	0.763705350320981

15 Lafayette, Opelousas, Morgan City, LA

We analyse the 7-day lagged moving average of the incidence cases and chose day 52 of data collection as "day 0".

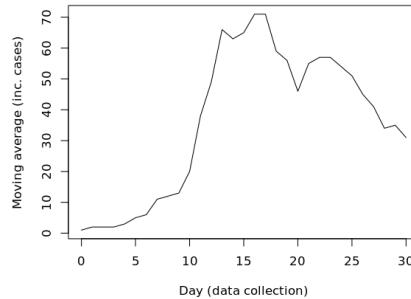


Figure 105: Incidence cases, day 0-30.

We performed the fit of the 4 basic parameters (k , C_{init} , I_{init} , p_{suc}) using the WebApp, for 200 times. The errors of the fit result as follows:

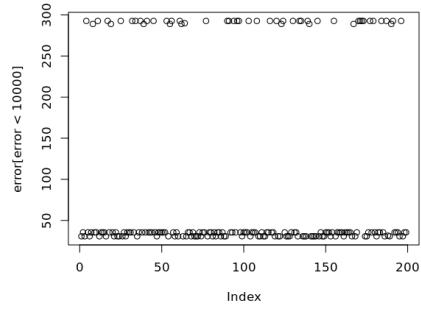


Figure 106: Error for each procedure

Excluding the highest errors (above 20000), we considered the values of the 4 basic parameters and look at their distributions:

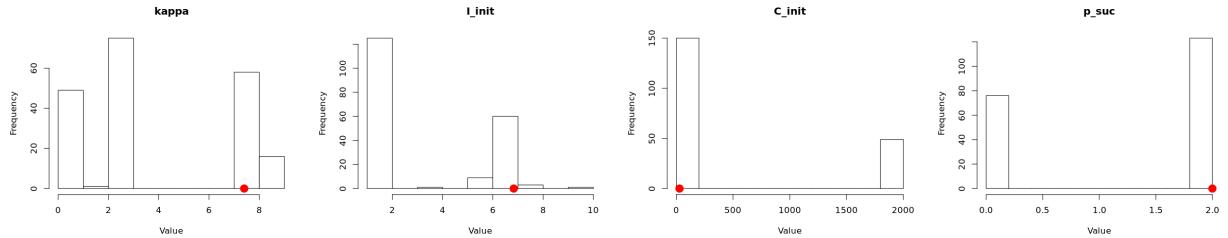


Figure 107: Distribution of 4 basic parameters (selected 4-tuple in red)

We fix the 4 basic parameters which gave the least error.



Figure 108: Screenshot of the WebApp for the best fit.

and we then move on to fit the 4 parameters of social distancing driver:

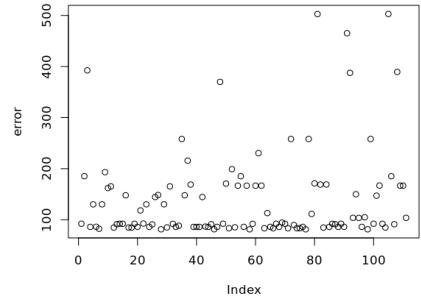


Figure 109: Error of phase 2 fit

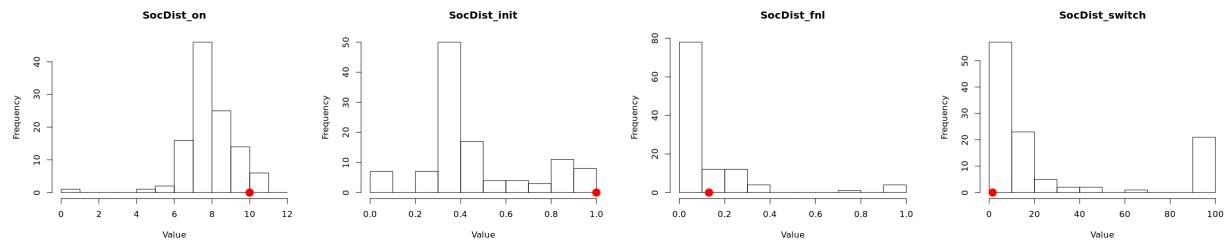


Figure 110: Distribution of parameters of social distancing driver (selected 4-tuple in red)



Figure 111: Screenshot of the WebApp for the best fit.

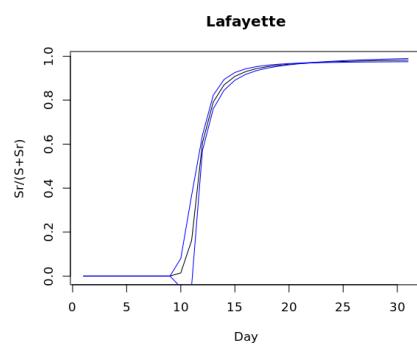


Figure 112: Curve flattening index (best 20 fits).

Parameters:

k	c	i	p
7.401936993446010	28.057416423794500	6.832243496167200	1.9999999999995930
socDist_on	socDist_in	socDist_fnl	socDist_switch
9.999999999122080	1	0.13080879421421200	1.5574480528192100

16 Las Vegas, Henderson, NV

We analyse the 7-day lagged moving average of the incidence cases and chose day 43 of data collection as "day 0".

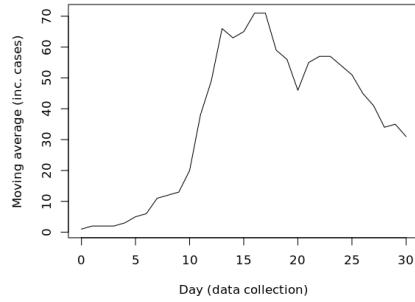


Figure 113: Incidence cases, day 0-30.

We performed the fit of the 4 basic parameters (k , C_{init} , I_{init} , p_{suc}) using the WebApp, for 200 times. The errors of the fit result as follows:

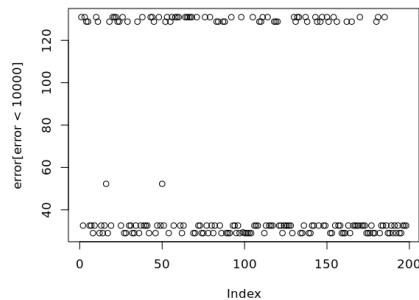


Figure 114: Error for each procedure

Excluding the highest errors (above 20000), we considered the values of the 4 basic parameters and look at their distributions:

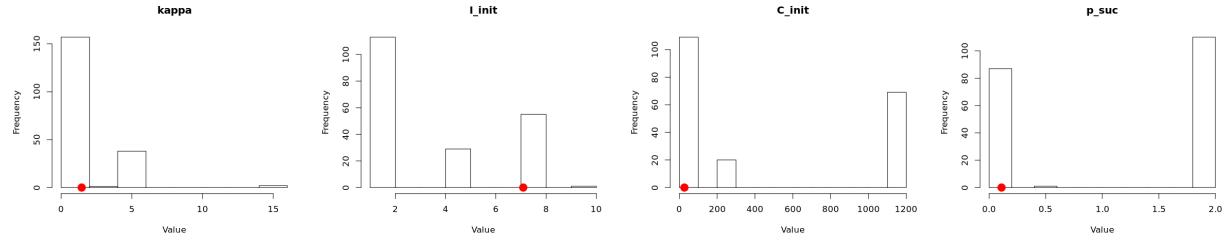


Figure 115: Distribution of 4 basic parameters (selected 4-tuple in red)

We fix the 4 basic parameters which gave the least error.

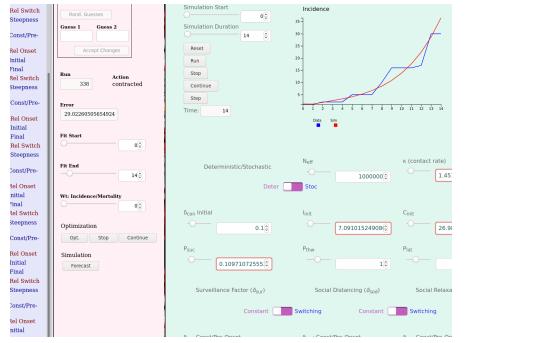


Figure 116: Screenshot of the WebApp for the best fit.

and we then move on to fit the 4 parameters of social distancing driver:

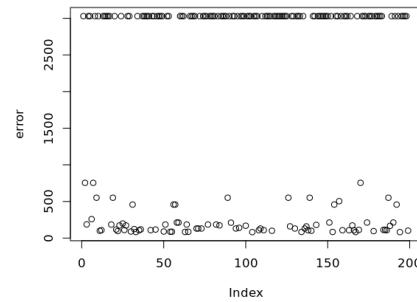


Figure 117: Error of phase 2 fit

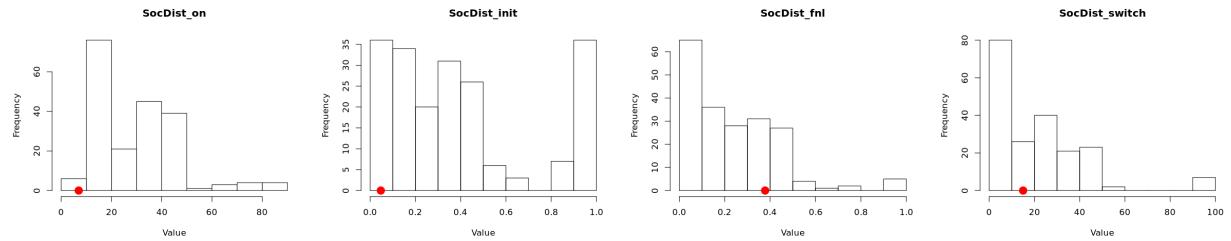


Figure 118: Distribution of parameters of social distancing driver (selected 4-tuple in red)

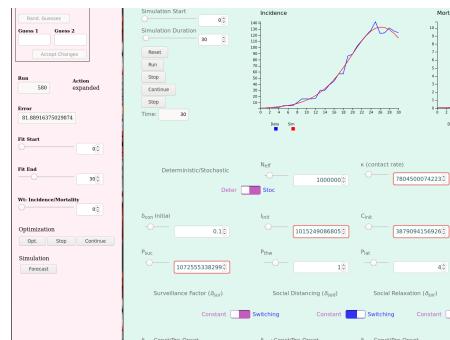


Figure 119: Screenshot of the WebApp for the best fit.

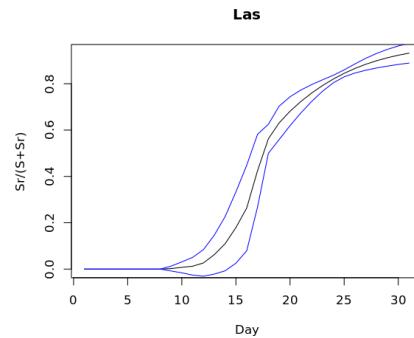


Figure 120: Curve flattening index (best 20 fits).

Parameters:

k	c	i	p
1.4517804500074200	26.983879094156900	7.091015249086810	0.10971072555338300
socDist_on	socDist_in	socDist_fnl	socDist_switch
6.999999999351330	0.047309684319818000	0.37811996839978900	15.01355348695700

17 Los Angeles, Long Beach, CA

We analyse the 7-day lagged moving average of the incidence cases and chose day 44 of data collection as "day 0".

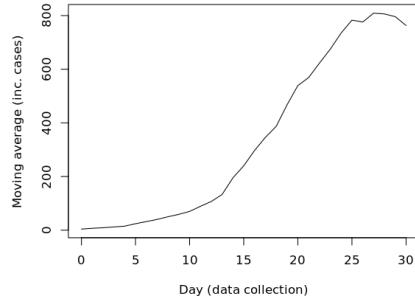


Figure 121: Incidence cases, day 0-30.

We performed the fit of the 4 basic parameters (k , C_{init} , I_{init} , p_{suc}) using the WebApp, for 200 times. The errors of the fit result as follows:

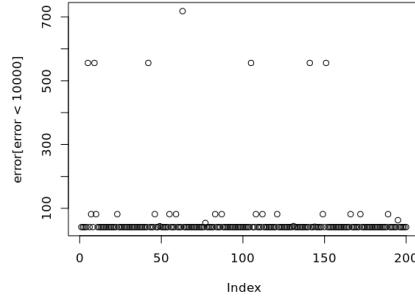


Figure 122: Error for each procedure

Excluding the highest errors (above 20000), we considered the values of the 4 basic parameters and look at their distributions:

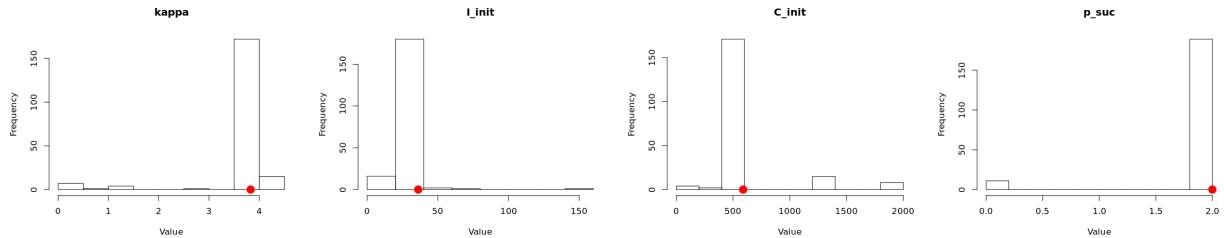


Figure 123: Distribution of 4 basic parameters (selected 4-tuple in red)

We fix the 4 basic parameters which gave the least error.

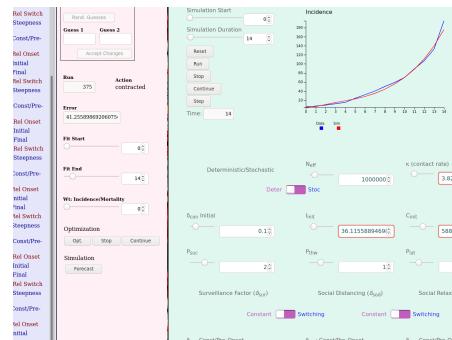


Figure 124: Screenshot of the WebApp for the best fit.

and we then move on to fit the 4 parameters of social distancing driver:

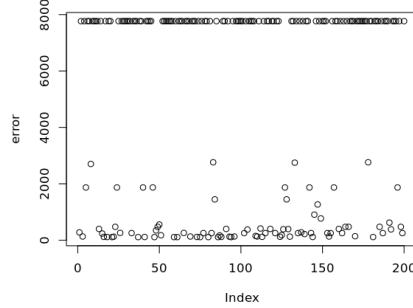


Figure 125: Error of phase 2 fit

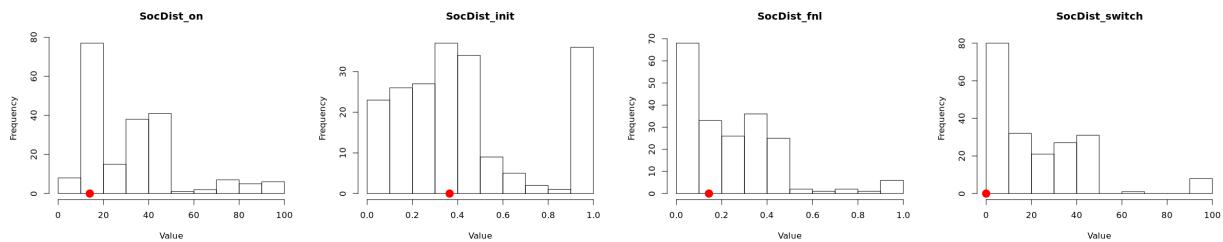


Figure 126: Distribution of parameters of social distancing driver (selected 4-tuple in red)

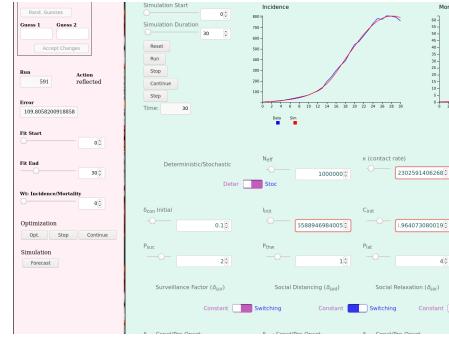


Figure 127: Screenshot of the WebApp for the best fit.

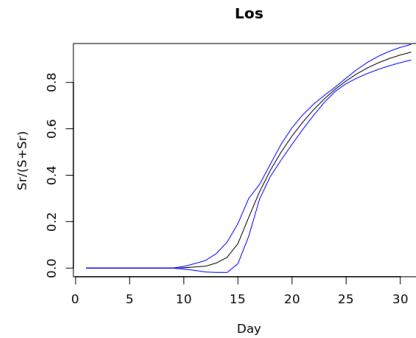


Figure 128: Curve flattening index (best 20 fits).

Parameters:

k	c	i	p
3.8282302591406300	588.964073080019	36.115588946984000	2
Parameters:	Value	Value	Value
socDist_on	socDist_in	socDist_fnl	socDist_switch
13.997613906629500	0.36462111519656700	0.14388955004587400	0.0031870943783419500

18 Miami, Port St Lucie, Fort Lauderdale, FL

We analyse the 7-day lagged moving average of the incidence cases and chose day 48 of data collection as "day 0".

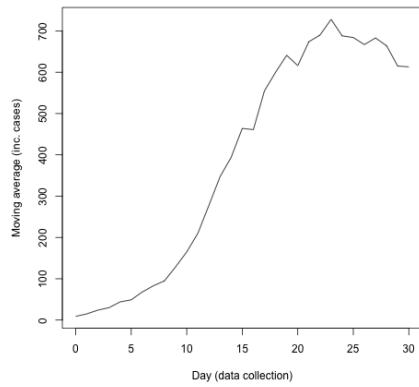


Figure 129: Incidence cases, day 0-30.

We performed the fit of the 4 basic parameters (k , C_{init} , I_{init} , p_{suc}) using the WebApp, for 200 times. The errors of the fit result as follows:

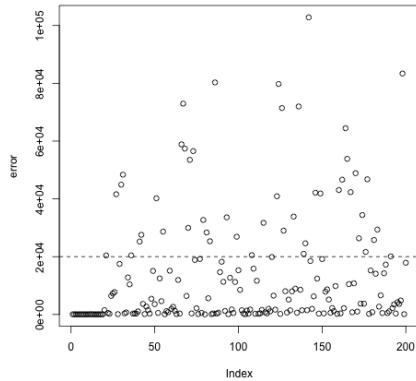


Figure 130: Error for each procedure

Excluding the highest errors (above 20000), we considered the values of the 4 basic parameters and look at their distributions:

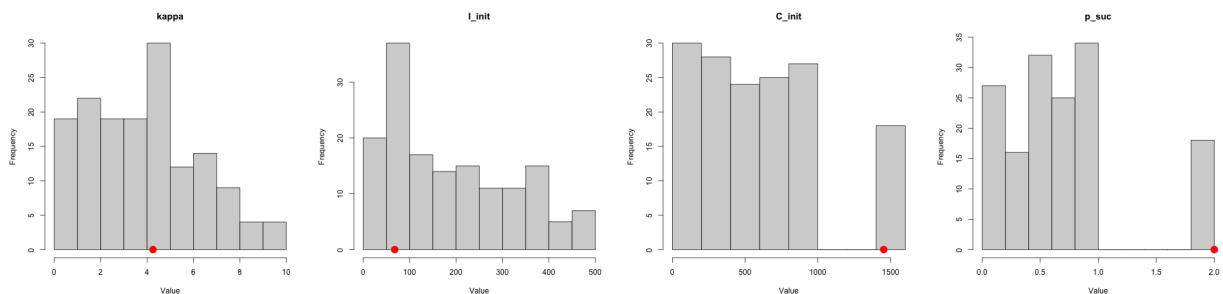


Figure 131: Distribution of 4 basic parameters (selected 4-tuple in red)

We fix the 4 basic parameters which gave the least error.



Figure 132: Screenshot of the WebApp for the best fit.

and we then move on to fit the 4 parameters of social distancing driver:

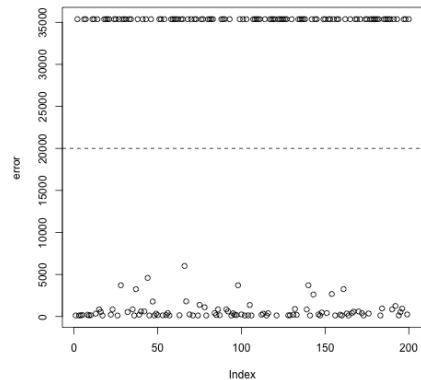


Figure 133: Error of phase 2 fit

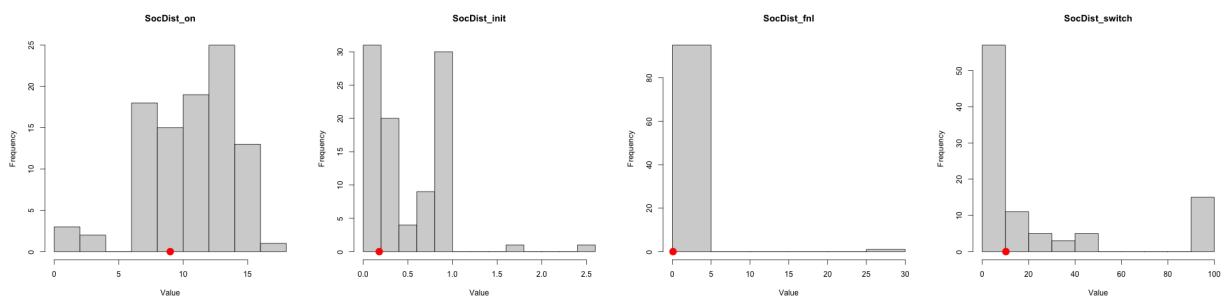


Figure 134: Distribution of parameters of social distancing driver (selected 4-tuple in red)



Figure 135: Screenshot of the WebApp for the best fit.

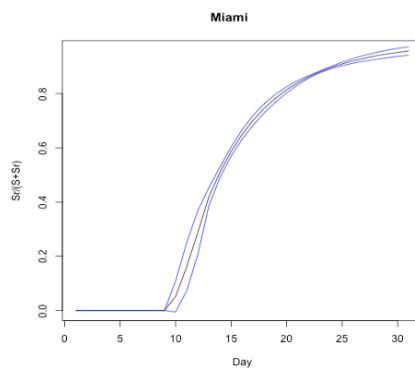


Figure 136: Curve flattening index (best 20 fits).

Parameters:

k	c	i	p
4.25658133129563	1452.51316296276	68.0111125260828	2
socDist_on	socDist_in	socDist_fnl	socDist_switch
8.99999999973021	0.179922796247375	0.0916652798022267	10.2217264364822

19 Minneapolis, St. Paul, MN, WI

We analyse the 7-day lagged moving average of the incidence cases and chose day 44 of data collection as "day 0".

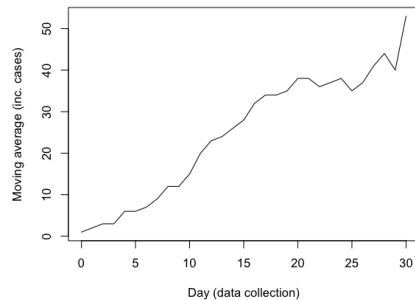


Figure 137: Incidence cases, day 0-30.

We performed the fit of the 4 basic parameters (k , C_{init} , I_{limit} , p_{suc}) using the WebApp, for 200 times. The errors of the fit result as follows:

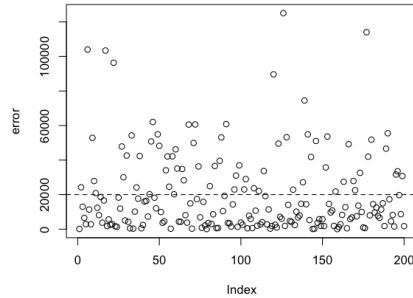


Figure 138: Error for each procedure

Excluding the highest errors (above 20000), we considered the values of the 4 basic parameters and look at their distributions:

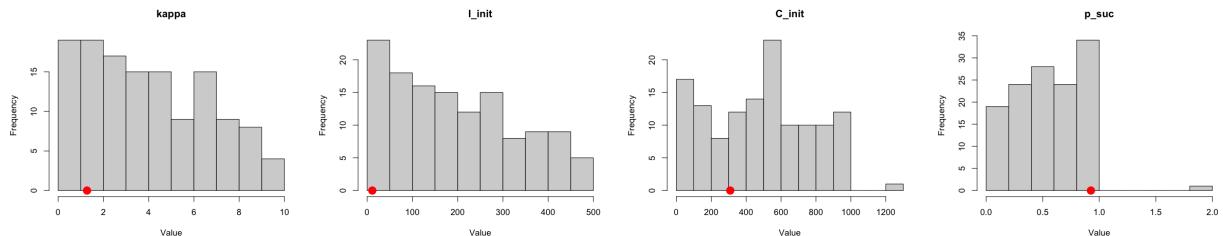


Figure 139: Distribution of 4 basic parameters (selected 4-tuple in red)

We fix the 4 basic parameters which gave the least error.

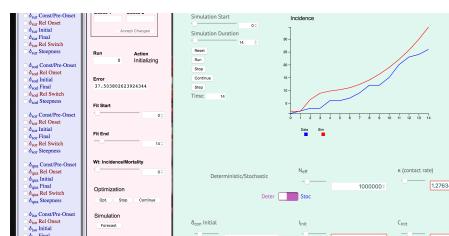


Figure 140: Screenshot of the WebApp for the best fit.

and we then move on to fit the 4 parameters of social distancing driver:

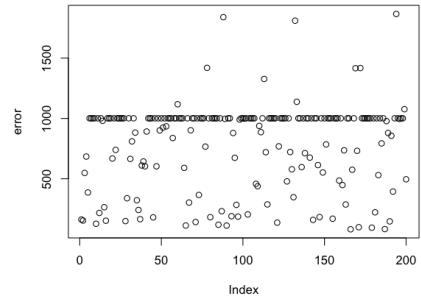


Figure 141: Error of phase 2 fit

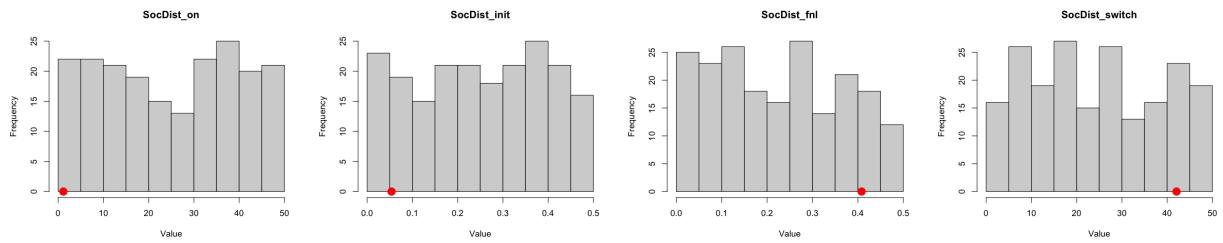


Figure 142: Distribution of parameters of social distancing driver (selected 4-tuple in red)

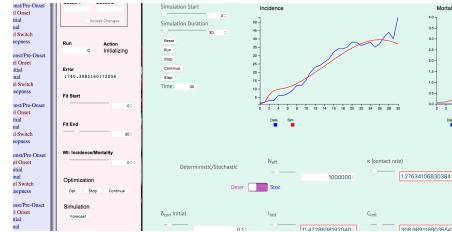


Figure 143: Screenshot of the WebApp for the best fit.

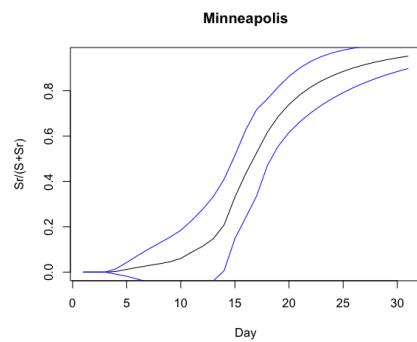


Figure 144: Curve flattening index (best 20 fits).

Parameters:

k	c	i	p
1.2763410683038500	308.98911890355400	11.422863819204100	0.9262536952879630
socDist_on	socDist_in	socDist_fnl	socDist_switch
1.1508244481505400	0.05397361611659330	0.40828551951421400	42.079876816220200

20 New Orleans, Metairie, Hammond, LA, MS

We analyse the 7-day lagged moving average of the incidence cases and chose day 45 of data collection as "day 0".

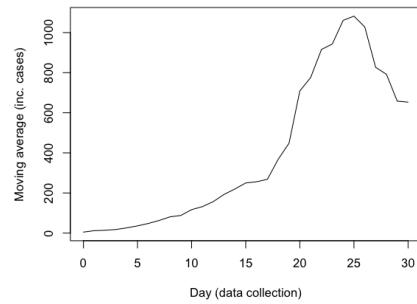


Figure 145: Incidence cases, day 0-30.

We performed the fit of the 4 basic parameters (k , C_{init} , I_{init} , p_{suc}) using the WebApp, for 200 times. The errors of the fit result as follows:

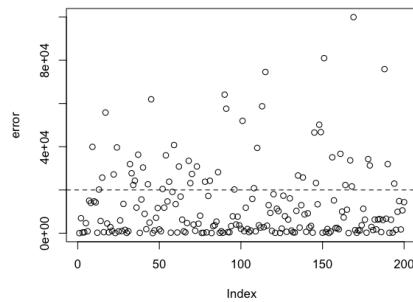


Figure 146: Error for each procedure

Excluding the highest errors (above 20000), we considered the values of the 4 basic parameters and look at their distributions:

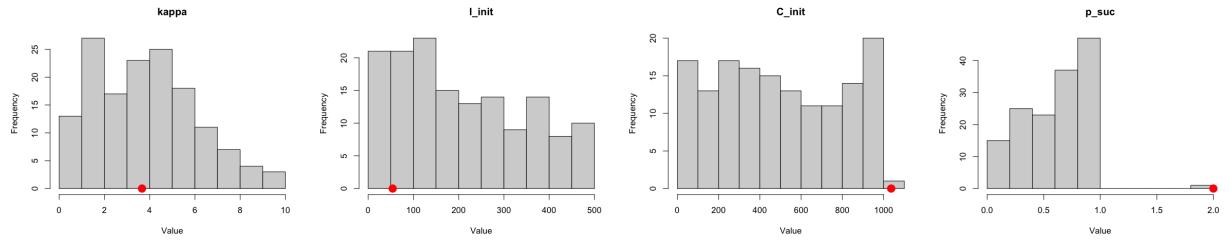


Figure 147: Distribution of 4 basic parameters (selected 4-tuple in red)

We fix the 4 basic parameters which gave the least error.

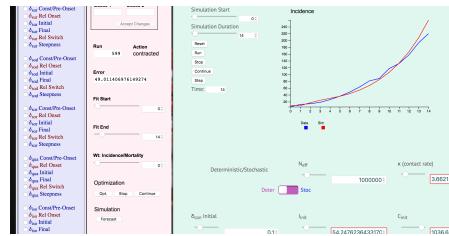


Figure 148: Screenshot of the WebApp for the best fit.

and we then move on to fit the 4 parameters of social distancing driver:

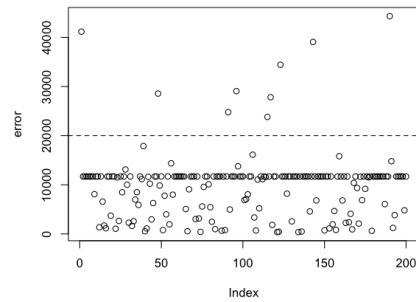


Figure 149: Error of phase 2 fit

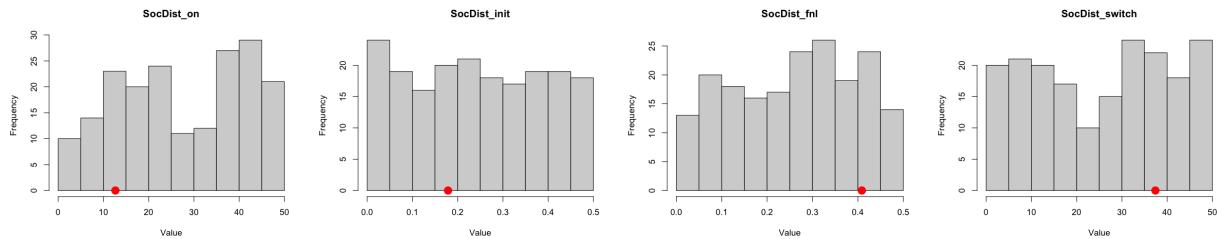


Figure 150: Distribution of parameters of social distancing driver (selected 4-tuple in red)

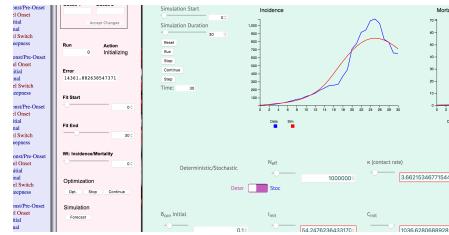


Figure 151: Screenshot of the WebApp for the best fit.

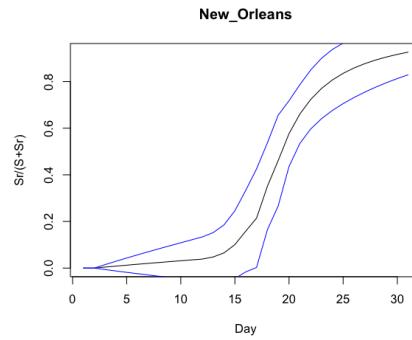


Figure 152: Curve flattening index (best 20 fits).

Parameters:

k	c	i	p
3.662153467715440	1036.6280688928200	54.24762364331700	1.9999999998482400
socDist_on	socDist_in	socDist_fnl	socDist_switch
12.653676025292700	0.17879849722173900	0.4087419488878690	37.40875338086420

21 New York, Newark, NY, NJ, CT, PA

We analyse the 7-day lagged moving average of the incidence cases and chose day 41 of data collection as "day 0".

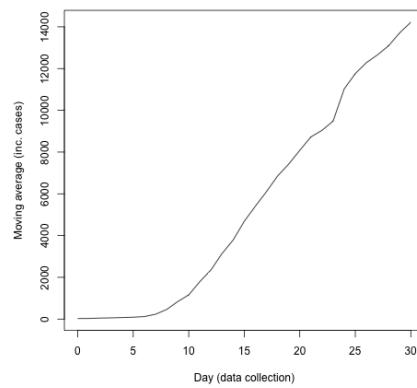


Figure 153: Incidence cases, day 0-30.

We performed the fit of the 4 basic parameters (k , C_{init} , I_{init} , p_{suc}) using the WebApp, for 200 times. The errors of the fit result as follows:

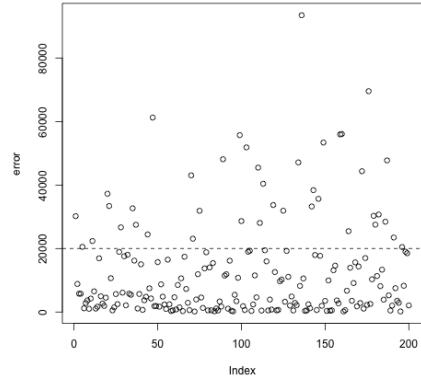


Figure 154: Error for each procedure

Excluding the highest errors (above 20000), we considered the values of the 4 basic parameters and look at their distributions:

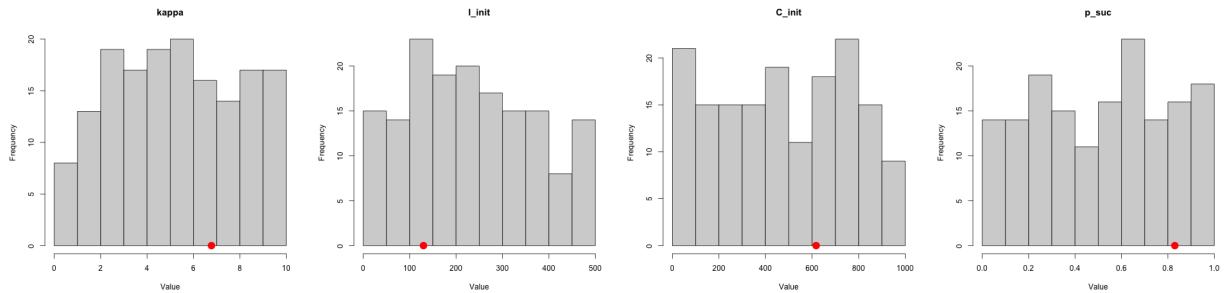


Figure 155: Distribution of 4 basic parameters (selected 4-tuple in red)

We fix the 4 basic parameters which gave the least error.

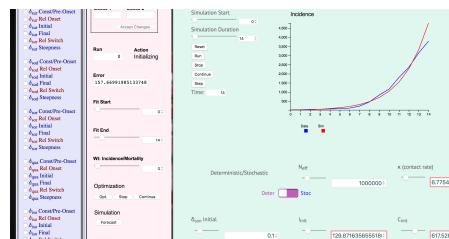


Figure 156: Screenshot of the WebApp for the best fit.

and we then move on to fit the 4 parameters of social distancing driver:

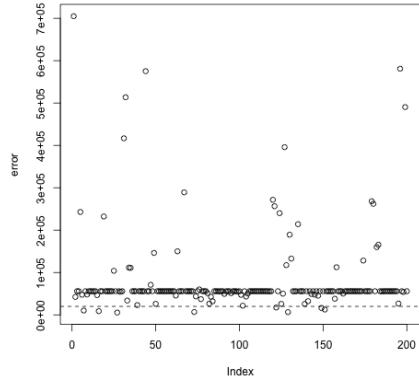


Figure 157: Error of phase 2 fit

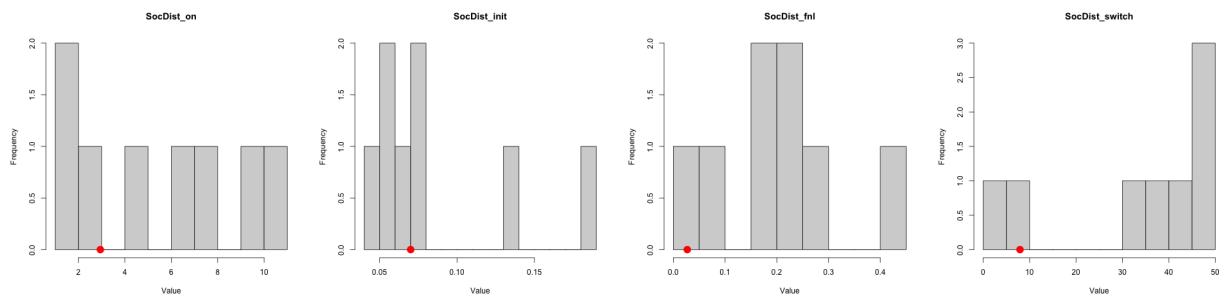


Figure 158: Distribution of parameters of social distancing driver (selected 4-tuple in red)



Figure 159: Screenshot of the WebApp for the best fit.

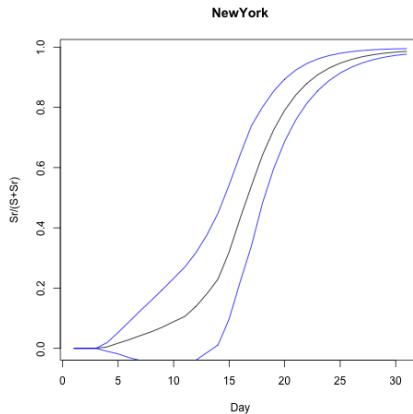


Figure 160: Curve flattening index (best 20 fits).

Parameters:

k	c	i	p
6.77546183376319	617.5281622076000	129.87163565551800	0.8299400831931860
socDist_on	socDist_in	socDist_fml	socDist_switch
2.946998452443670	0.07004268286834850	0.026924623180509000	7.931623786671970

22 North Port, Sarasota, FL

We analyse the 7-day lagged moving average of the incidence cases and chose day 41 of data collection as "day 0".

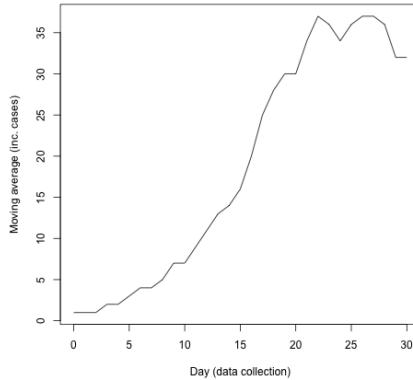


Figure 161: Incidence cases, day 0-30.

We performed the fit of the 4 basic parameters (k , C_{init} , I_{init} , p_suc) using the WebApp, for 200 times. The errors of the fit result as follows:

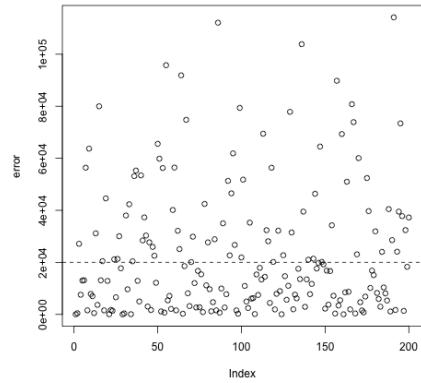


Figure 162: Error for each procedure

Excluding the highest errors (above 20000), we considered the values of the 4 basic parameters and look at their distributions:

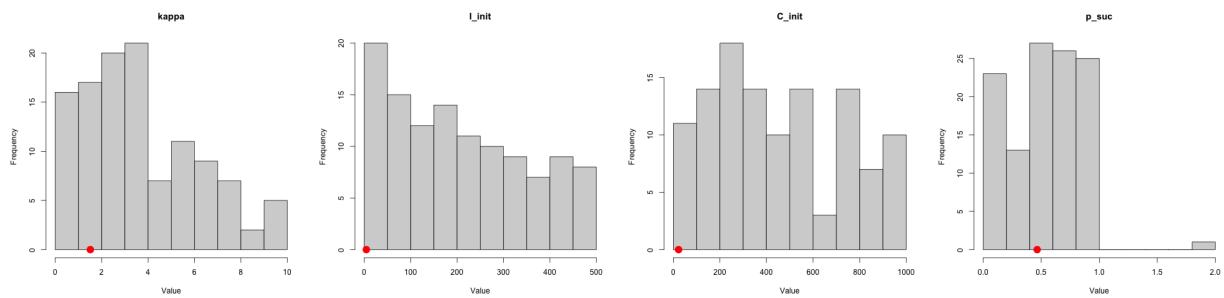


Figure 163: Distribution of 4 basic parameters (selected 4-tuple in red)

We fix the 4 basic parameters which gave the least error.

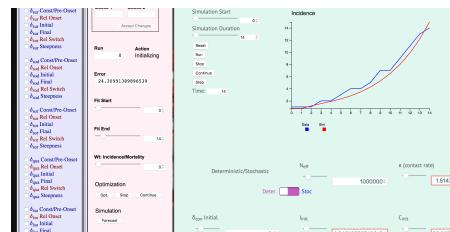


Figure 164: Screenshot of the WebApp for the best fit.

and we then move on to fit the 4 parameters of social distancing driver:

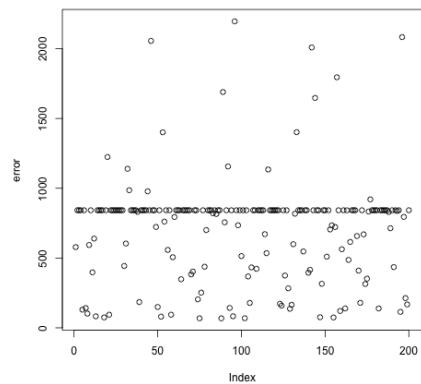


Figure 165: Error of phase 2 fit

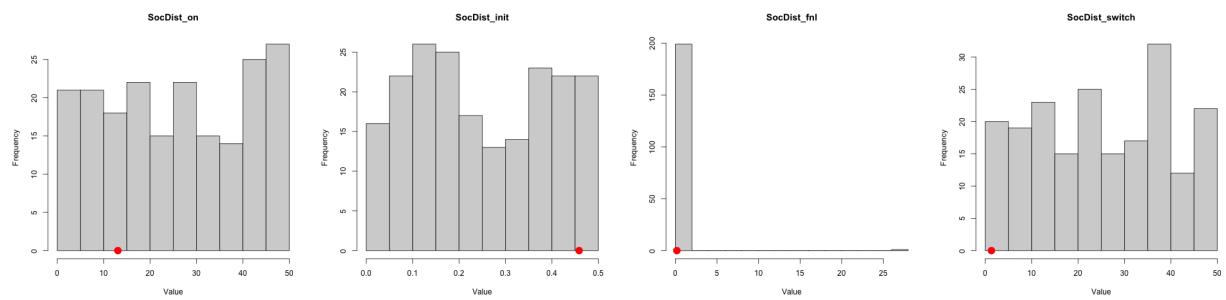


Figure 166: Distribution of parameters of social distancing driver (selected 4-tuple in red)

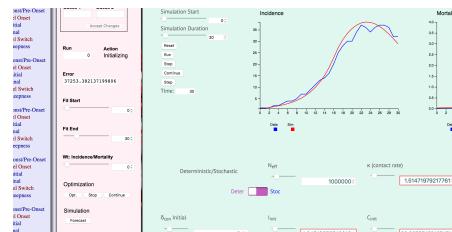


Figure 167: Screenshot of the WebApp for the best fit.

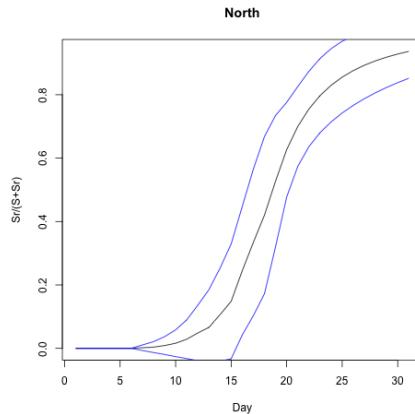


Figure 168: Curve flattening index (best 20 fits).

Parameters:

k	c	i	p
1.51471979217761	22.607871551674800	4.645188787490140	0.4652679614250080
socDist_on	socDist_in	socDist_fml	socDist_switch
13.071488546076900	0.4586720458323330	0.18255812883228900	1.3475657667912100

23 Orlando, Lakeland, Deltona, FL

We analyse the 7-day lagged moving average of the incidence cases and chose day 41 of data collection as "day 0".

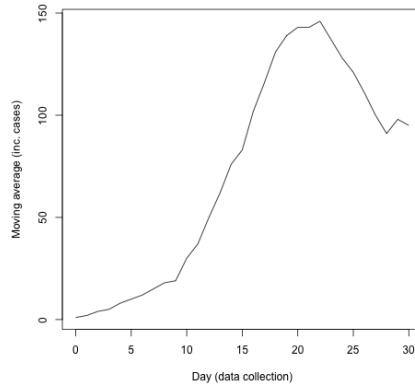


Figure 169: Incidence cases, day 0-30.

We performed the fit of the 4 basic parameters (k , C_{init} , I_{init} , p_{suc}) using the WebApp, for 200 times. The errors of the fit result as follows:

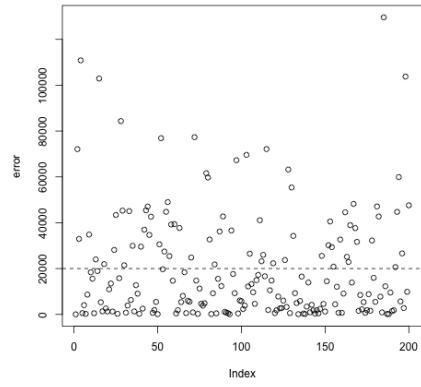


Figure 170: Error for each procedure

Excluding the highest errors (above 20000), we considered the values of the 4 basic parameters and look at their distributions:

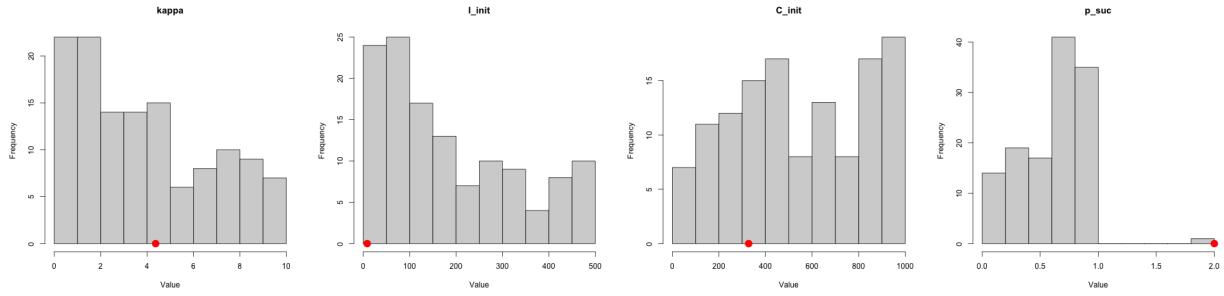


Figure 171: Distribution of 4 basic parameters (selected 4-tuple in red)

We fix the 4 basic parameters which gave the least error.

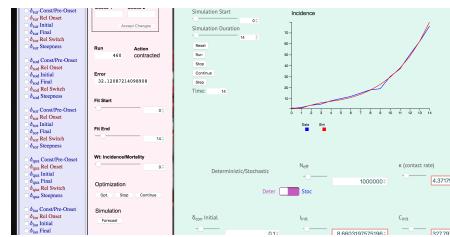


Figure 172: Screenshot of the WebApp for the best fit.

and we then move on to fit the 4 parameters of social distancing driver:

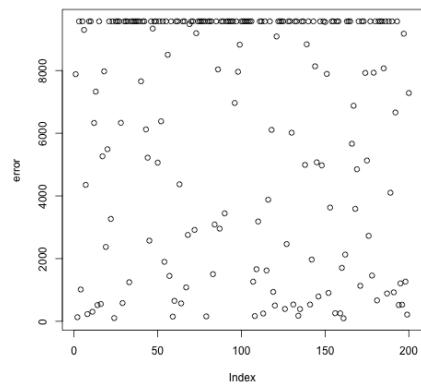


Figure 173: Error of phase 2 fit

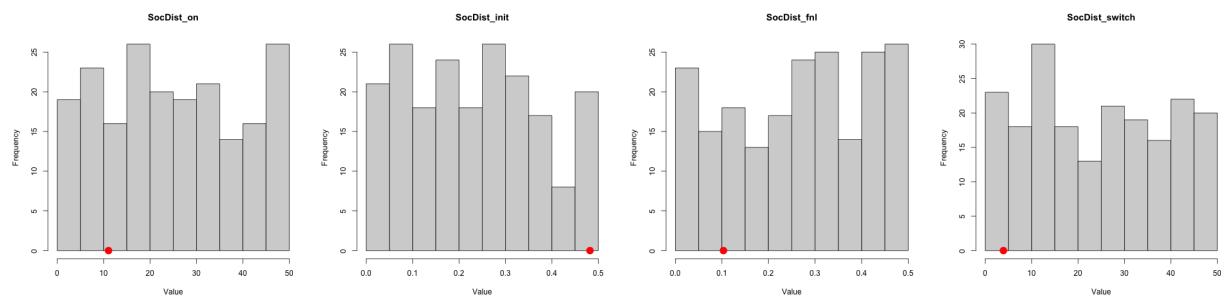


Figure 174: Distribution of parameters of social distancing driver (selected 4-tuple in red)

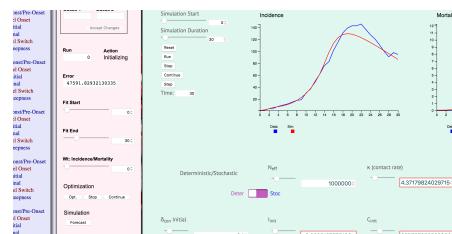


Figure 175: Screenshot of the WebApp for the best fit.

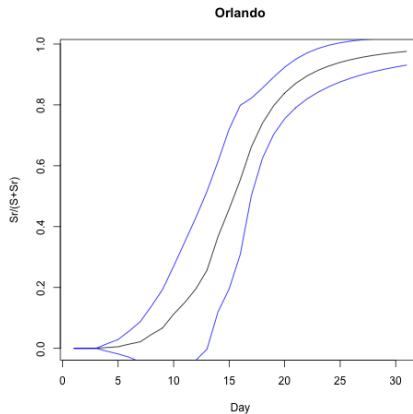


Figure 176: Curve flattening index (best 20 fits).

Parameters:

k	c	i	p
4.371798240297160	327.7973535689880	8.6603197575196	1.9999999999955800
socDist_on	socDist_in	socDist_fml	socDist_switch
11.058617849355500	0.4820538766410000	0.1033319647415130	3.9329677368147000

24 Philadelphia, Reading, Camden, PA, NJ, DE, MD

We analyse the 7-day lagged moving average of the incidence cases and chose day 41 of data collection as "day 0".

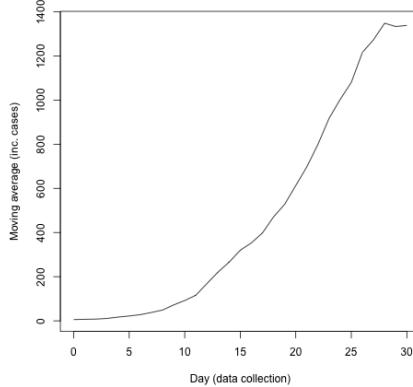


Figure 177: Incidence cases, day 0-30.

We performed the fit of the 4 basic parameters (k , C_{init} , I_{init} , p_{suc}) using the WebApp, for 200 times. The errors of the fit result as follows:

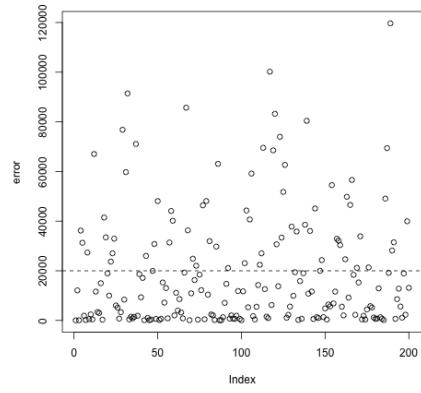


Figure 178: Error for each procedure

Excluding the highest errors (above 20000), we considered the values of the 4 basic parameters and look at their distributions:

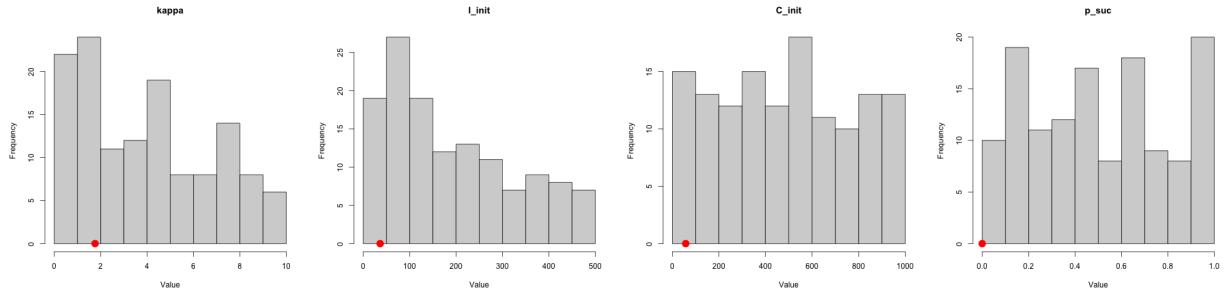


Figure 179: Distribution of 4 basic parameters (selected 4-tuple in red)

We fix the 4 basic parameters which gave the least error.

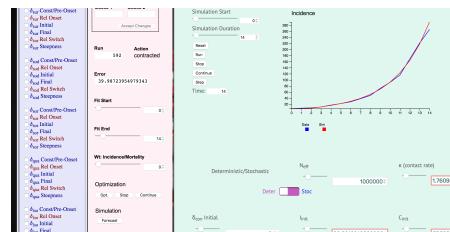


Figure 180: Screenshot of the WebApp for the best fit.

and we then move on to fit the 4 parameters of social distancing driver:

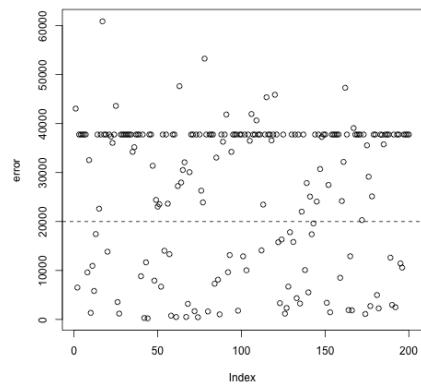


Figure 181: Error of phase 2 fit

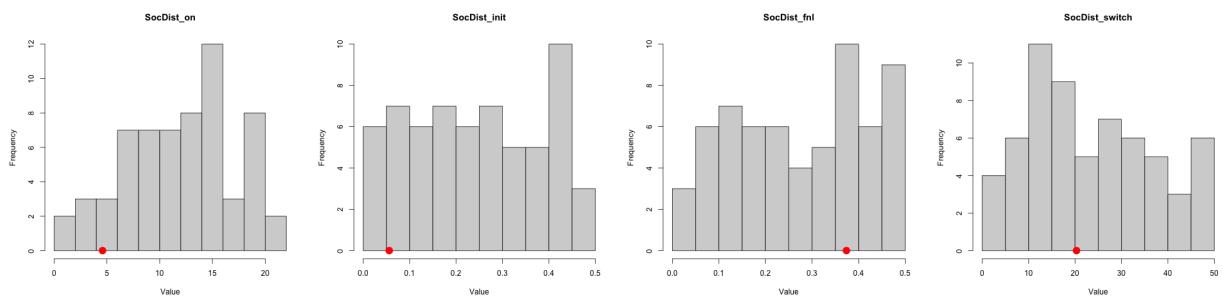


Figure 182: Distribution of parameters of social distancing driver (selected 4-tuple in red)

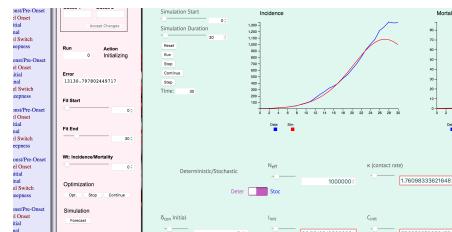


Figure 183: Screenshot of the WebApp for the best fit.

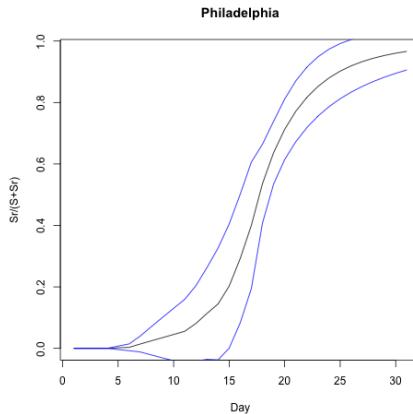


Figure 184: Curve flattening index (best 20 fits).

Parameters:

k	c	i	p
1.760983336216490	57.525297663547200	36.561291933002800	1.72537420045376E-10
socDist_on	socDist_in	socDist_fml	socDist_switch
4.5851414443500200	0.056130759817375600	0.3737703478505000	20.318151002787900

25 Phoenix, Mesa, AZ

We analyse the 7-day lagged moving average of the incidence cases and chose day 46 of data collection as "day 0".

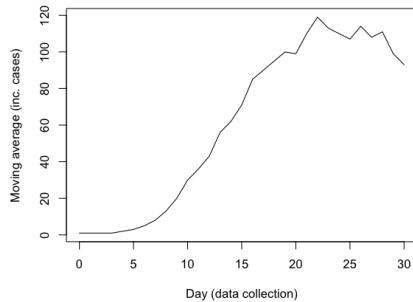


Figure 185: Incidence cases, day 0-30.

We performed the fit of the 4 basic parameters (k , C_{init} , I_{init} , p_{suc}) using the WebApp, for 200 times. The errors of the fit result as follows:

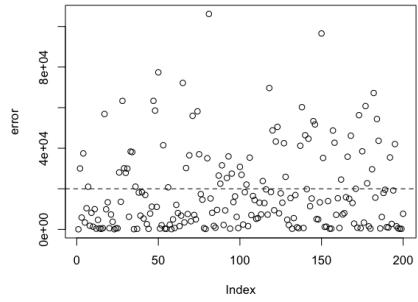


Figure 186: Error for each procedure

Excluding the highest errors (above 20000), we considered the values of the 4 basic parameters and look at their distributions:

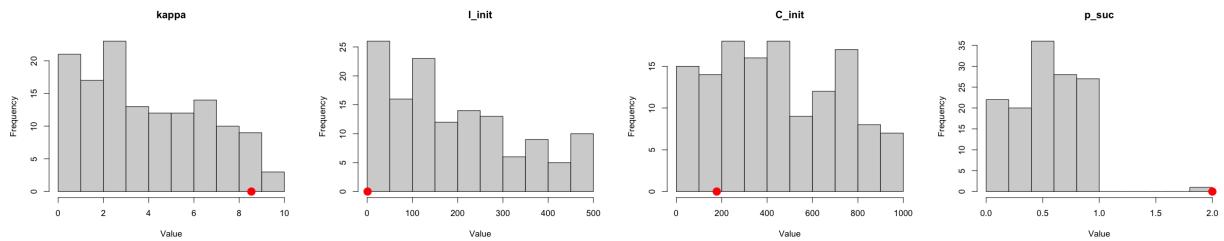


Figure 187: Distribution of 4 basic parameters (selected 4-tuple in red)

We fix the 4 basic parameters which gave the least error.

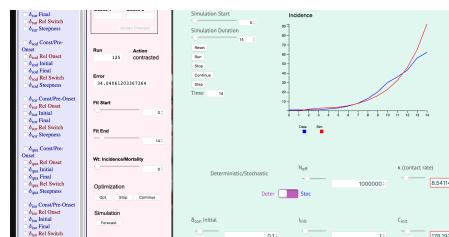


Figure 188: Screenshot of the WebApp for the best fit.

and we then move on to fit the 4 parameters of social distancing driver:

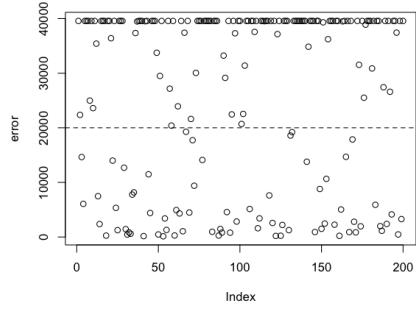


Figure 189: Error of phase 2 fit

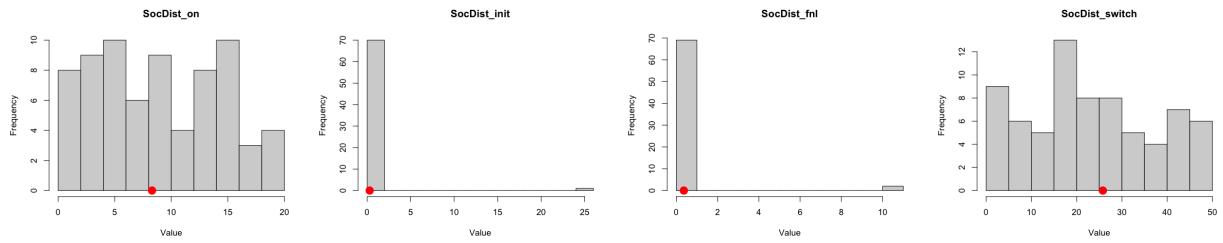


Figure 190: Distribution of parameters of social distancing driver (selected 4-tuple in red)

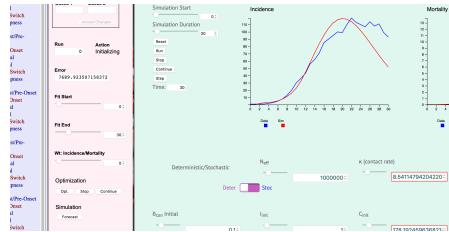


Figure 191: Screenshot of the WebApp for the best fit.

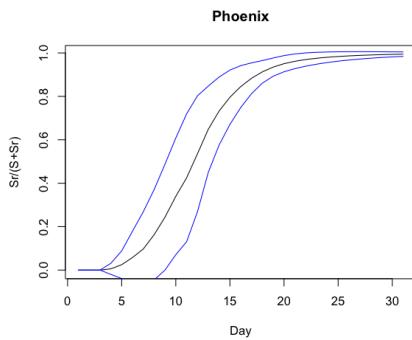


Figure 192: Curve flattening index (best 20 fits).

Parameters:

k	c	i	p
8.541147942042200	178.1924596368220	1	2
socDist_on	socDist_in	socDist_fnl	socDist_switch
8.301518118547910	0.2905971358199100	0.3647955860353650	25.793350685575100

26 Shreveport, Bossier City, Minden, LA

We analyse the 7-day lagged moving average of the incidence cases and chose day 48 of data collection as "day 0".

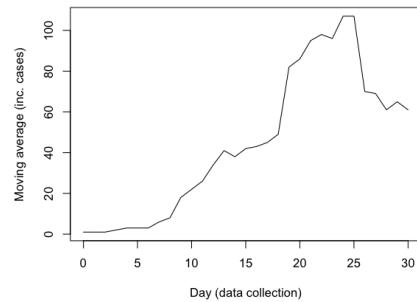


Figure 193: Incidence cases, day 0-30.

We performed the fit of the 4 basic parameters (k , C_{init} , I_{init} , p_{suc}) using the WebApp, for 200 times. The errors of the fit result as follows:

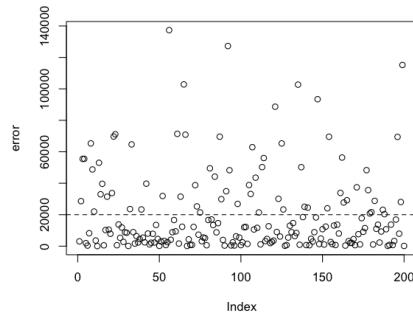


Figure 194: Error for each procedure

Excluding the highest errors (above 20000), we considered the values of the 4 basic parameters and look at their distributions:

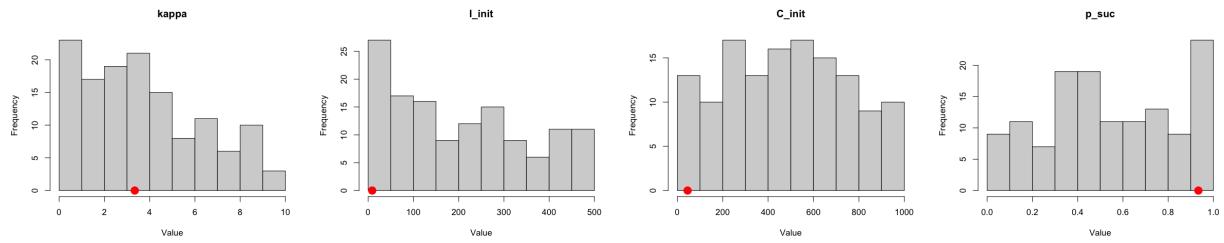


Figure 195: Distribution of 4 basic parameters (selected 4-tuple in red)

We fix the 4 basic parameters which gave the least error.



Figure 196: Screenshot of the WebApp for the best fit.

and we then move on to fit the 4 parameters of social distancing driver:

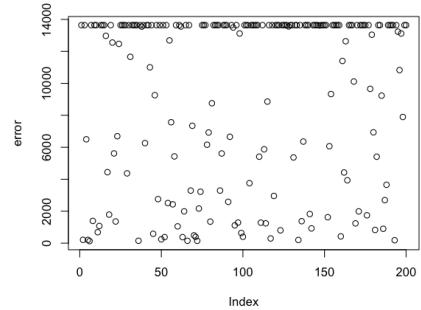


Figure 197: Error of phase 2 fit

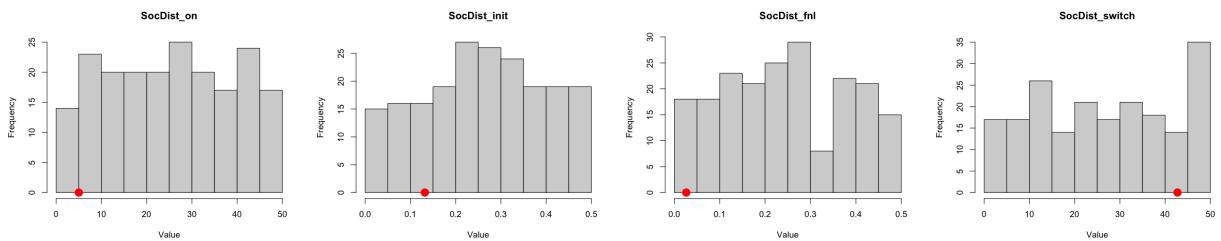


Figure 198: Distribution of parameters of social distancing driver (selected 4-tuple in red)

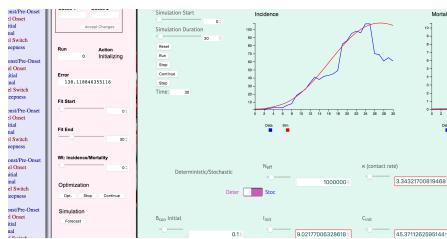


Figure 199: Screenshot of the WebApp for the best fit.

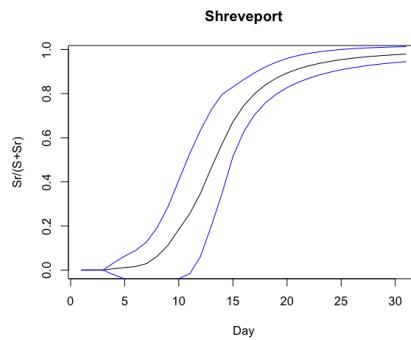


Figure 200: Curve flattening index (best 20 fits).

Parameters:

k	c	i	p
3.343217008194680	45.37112625951450	9.021770063286190	0.93369227717251
socDist_on	socDist_in	socDist_fnl	socDist_switch
5.012333570646780	0.1318420560145560	0.026295618430093800	42.72287669561970

27 San Antonio, New Braunfels, Pearsall, TX

We analyse the 7-day lagged moving average of the incidence cases and chose day 50 of data collection as "day 0".

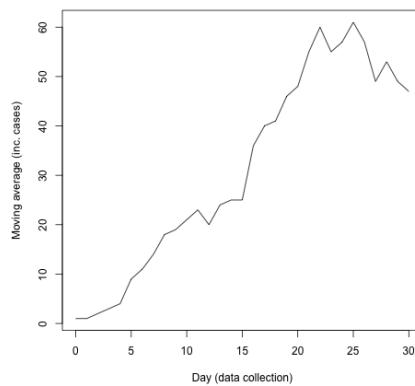


Figure 201: Incidence cases, day 0-30.

We performed the fit of the 4 basic parameters (k , C_{init} , I_{init} , p_{suc}) using the WebApp, for 200 times. The errors of the fit result as follows:

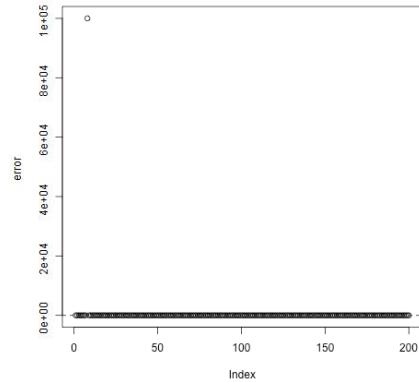


Figure 202: Error for each procedure

Excluding the highest errors (above 20000), we considered the values of the 4 basic parameters and look at their distributions:

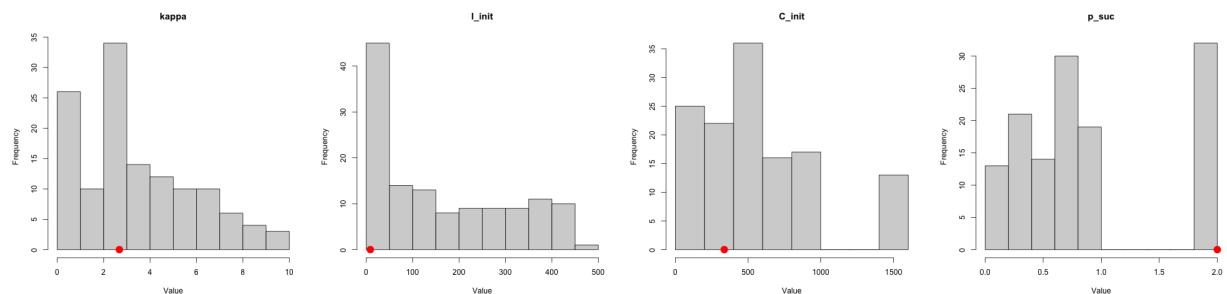


Figure 203: Distribution of 4 basic parameters (selected 4-tuple in red)

We fix the 4 basic parameters which gave the least error.



Figure 204: Screenshot of the WebApp for the best fit.

and we then move on to fit the 4 parameters of social distancing driver:

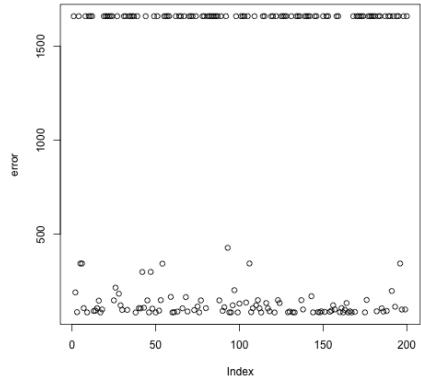


Figure 205: Error of phase 2 fit

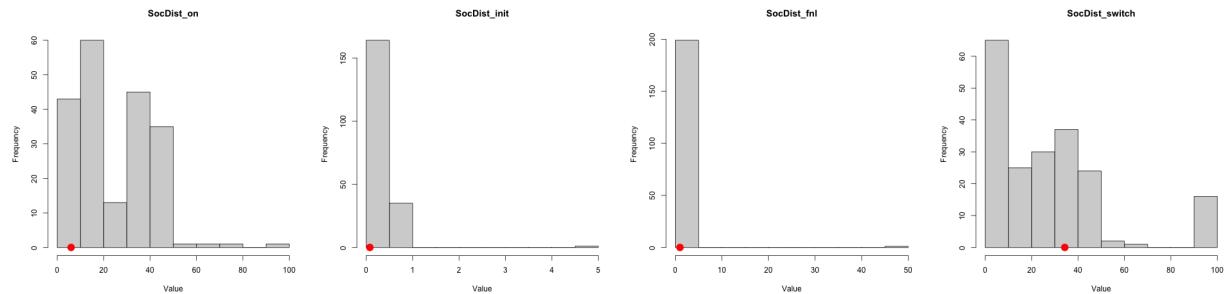


Figure 206: Distribution of parameters of social distancing driver (selected 4-tuple in red)



Figure 207: Screenshot of the WebApp for the best fit.

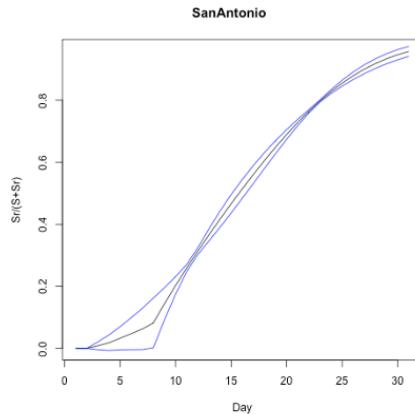


Figure 208: Curve flattening index (best 20 fits).

Parameters:

k	c	i	p
2.67912586959509	336.327666328065	8.99474845679512	2
socDist_on	socDist_in	socDist_fml	socDist_switch
5.00000663226069	0.0663058025868406	0.530836511056905	25.4733980825214

28 St. Louis, St. Charles, Farmington, MO, IL

We analyse the 7-day lagged moving average of the incidence cases and chose day 47 of data collection as "day 0".

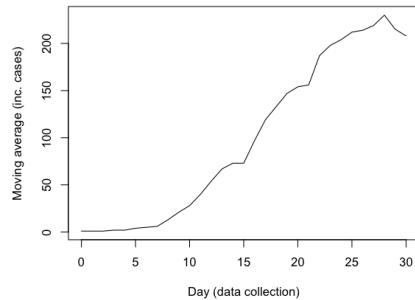


Figure 209: Incidence cases, day 0-30.

We performed the fit of the 4 basic parameters (k , C_{init} , I_{init} , p_{suc}) using the WebApp, for 200 times. The errors of the fit result as follows:

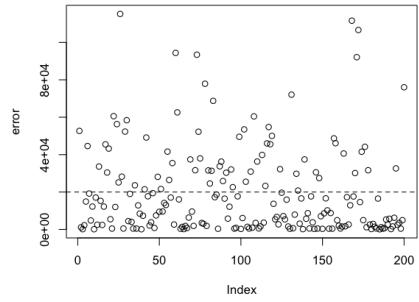


Figure 210: Error for each procedure

Excluding the highest errors (above 20000), we considered the values of the 4 basic parameters and look at their distributions:

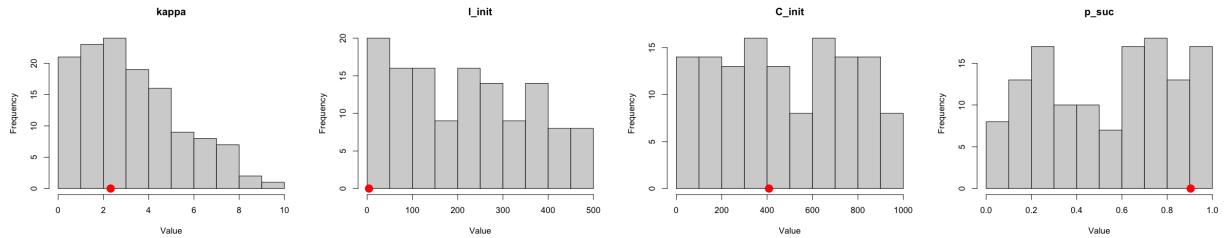


Figure 211: Distribution of 4 basic parameters (selected 4-tuple in red)

We fix the 4 basic parameters which gave the least error.

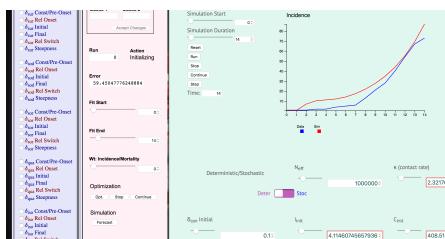


Figure 212: Screenshot of the WebApp for the best fit.

and we then move on to fit the 4 parameters of social distancing driver:

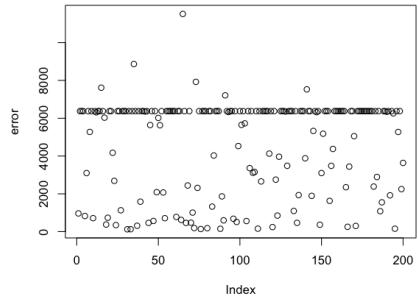


Figure 213: Error of phase 2 fit

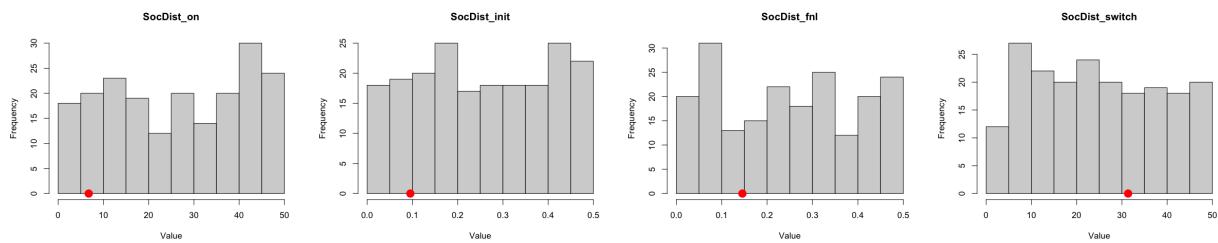


Figure 214: Distribution of parameters of social distancing driver (selected 4-tuple in red)

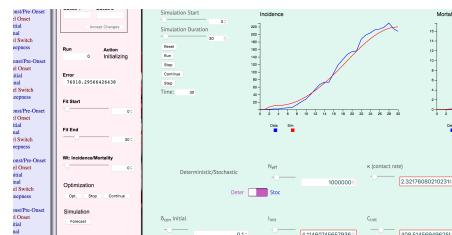


Figure 215: Screenshot of the WebApp for the best fit.

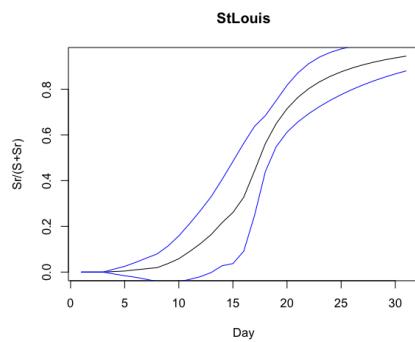


Figure 216: Curve flattening index (best 20 fits).

Parameters:

k	c	i	p
2.321760802102320	408.5145694962600	4.1146074565793600	0.9040895508404460
socDist_on	socDist_in	socDist_fnl	socDist_switch
6.758461983916490	0.0954848793166011	0.14558262214087600	31.37840048752770

29 Tucson, Nogales, AZ

We analyse the 7-day lagged moving average of the incidence cases and chose day 49 of data collection as "day 0".

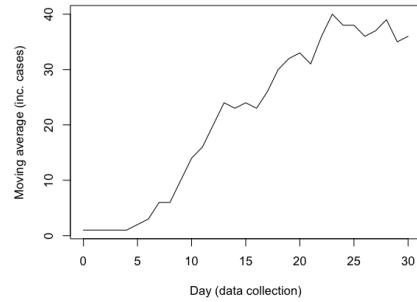


Figure 217: Incidence cases, day 0-30.

We performed the fit of the 4 basic parameters (k , C_{init} , I_{init} , p_{suc}) using the WebApp, for 200 times. The errors of the fit result as follows:

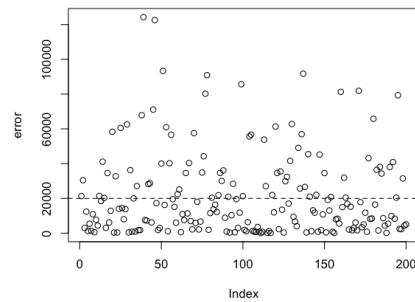


Figure 218: Error for each procedure

Excluding the highest errors (above 20000), we considered the values of the 4 basic parameters and look at their distributions:

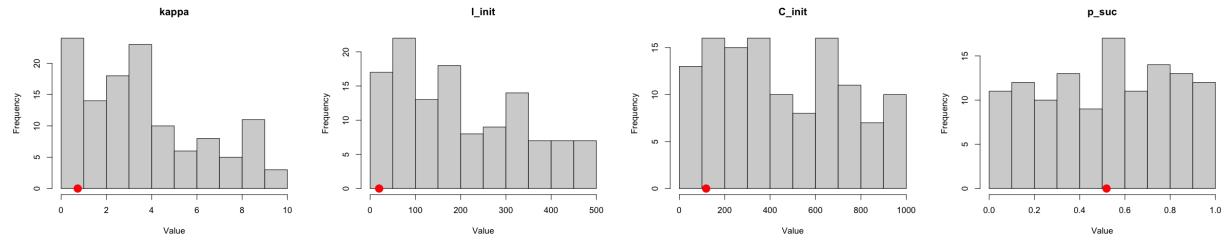


Figure 219: Distribution of 4 basic parameters (selected 4-tuple in red)

We fix the 4 basic parameters which gave the least error.

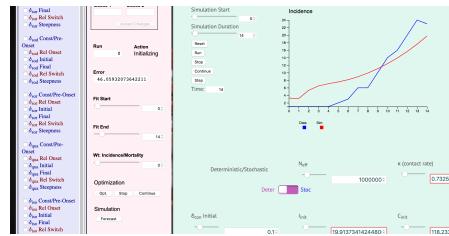


Figure 220: Screenshot of the WebApp for the best fit.

and we then move on to fit the 4 parameters of social distancing driver:

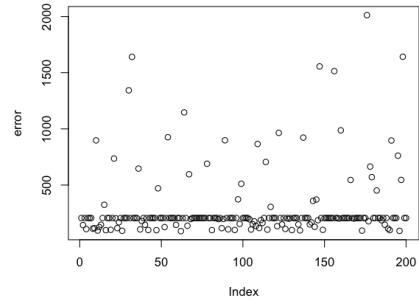


Figure 221: Error of phase 2 fit

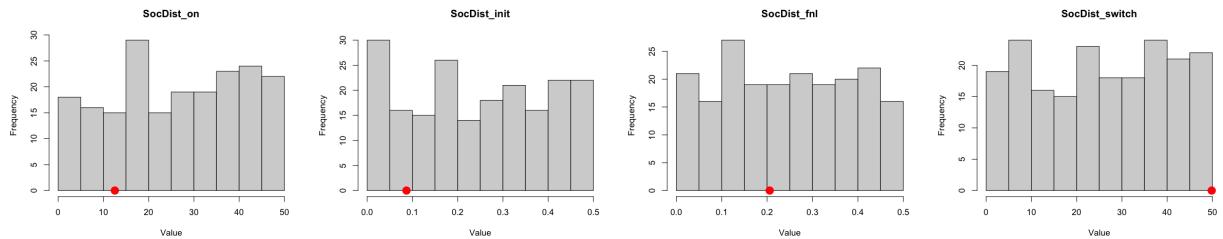


Figure 222: Distribution of parameters of social distancing driver (selected 4-tuple in red)

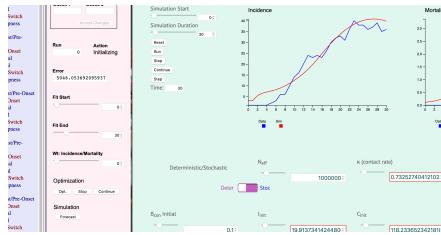


Figure 223: Screenshot of the WebApp for the best fit.

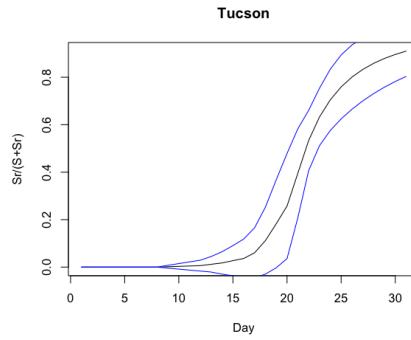


Figure 224: Curve flattening index (best 20 fits).

Parameters:

k	c	i	p
0.7325274041210240	118.23365234218200	19.913734142448000	0.5188962551210600
socDist_on	socDist_in	socDist_fnl	socDist_switch
12.530231280410800	0.08692425464478430	0.20573112235316100	49.85149293704830

30 Washington, Baltimore, Arlington, DC, MD, VA, WV, PA

We analyse the 7-day lagged moving average of the incidence cases and chose day 40 of data collection as "day 0".

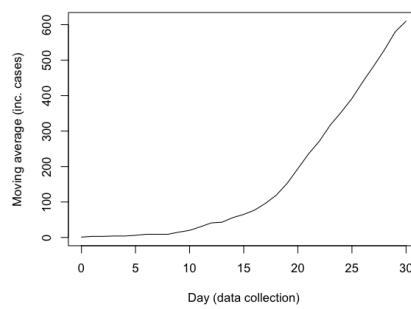


Figure 225: Incidence cases, day 0-30.

We performed the fit of the 4 basic parameters (k , C_{init} , I_{init} , p_{suc}) using the WebApp, for 200 times. The errors of the fit result as follows:

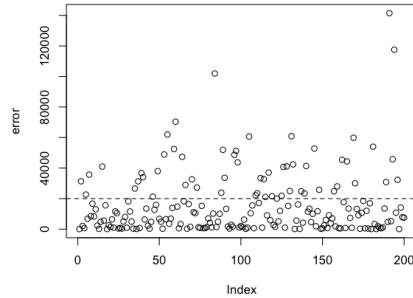


Figure 226: Error for each procedure

Excluding the highest errors (above 20000), we considered the values of the 4 basic parameters and look at their distributions:

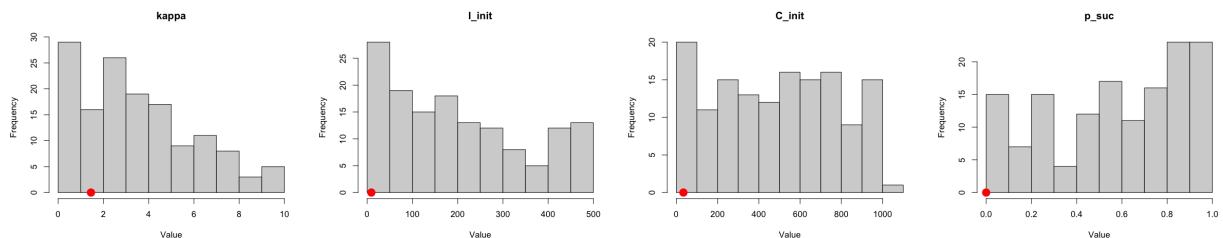


Figure 227: Distribution of 4 basic parameters (selected 4-tuple in red)

We fix the 4 basic parameters which gave the least error.



Figure 228: Screenshot of the WebApp for the best fit.

and we then move on to fit the 4 parameters of social distancing driver:

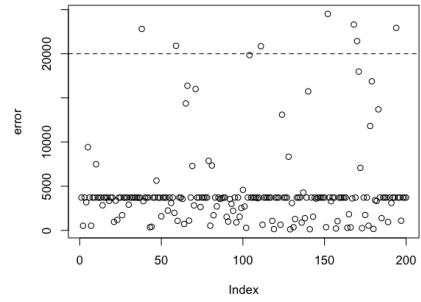


Figure 229: Error of phase 2 fit

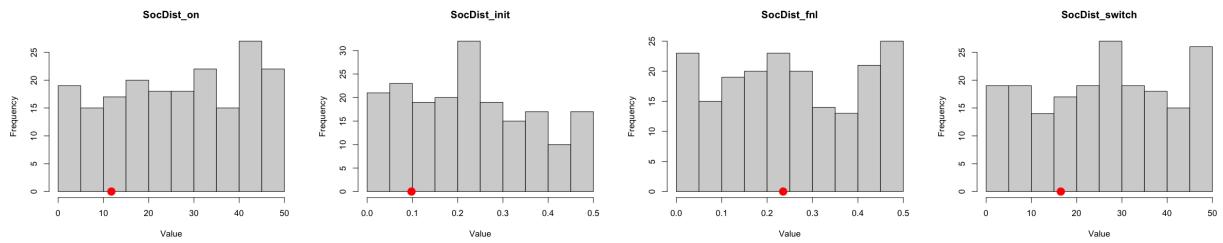


Figure 230: Distribution of parameters of social distancing driver (selected 4-tuple in red)

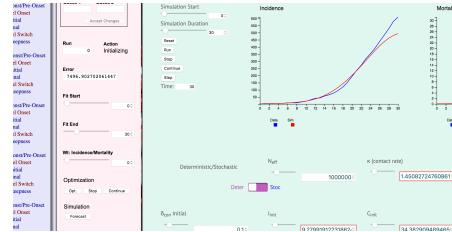


Figure 231: Screenshot of the WebApp for the best fit.

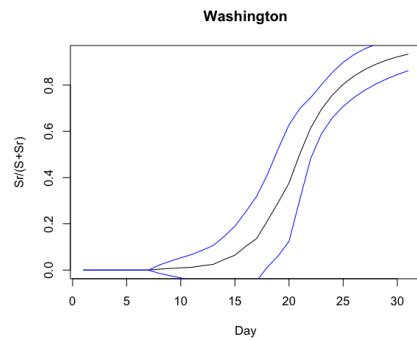
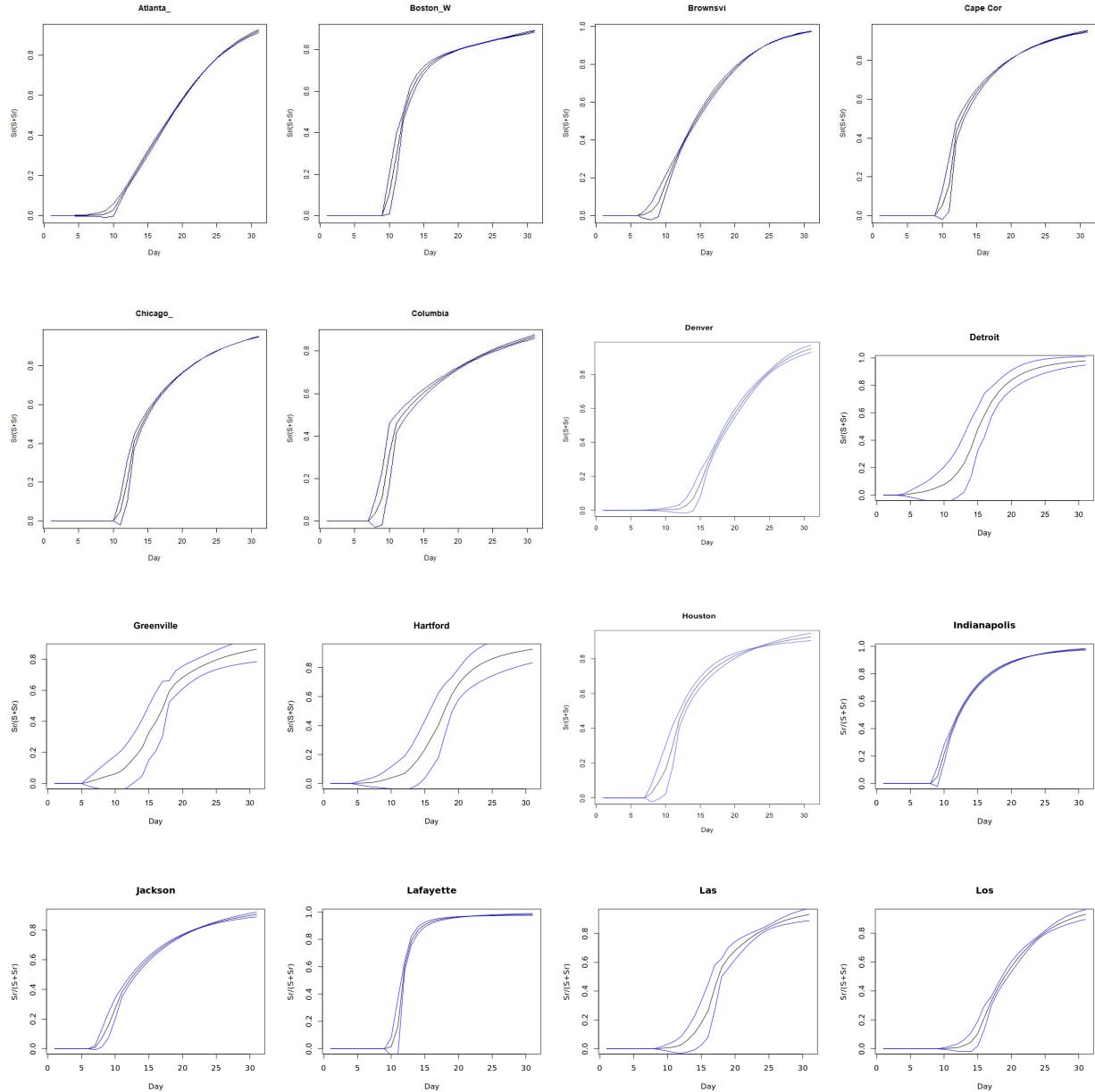


Figure 232: Curve flattening index (best 20 fits).

Parameters:

k	c	i	p
1.4508272476086200	34.382909489466000	9.279919122318620	7.55883056884567E-09
socDist_on	socDist_in	socDist_fnl	socDist_switch
11.769086085677900	0.09804415331204700	0.23537031763322700	16.499203890820700

31 Curve flattening index



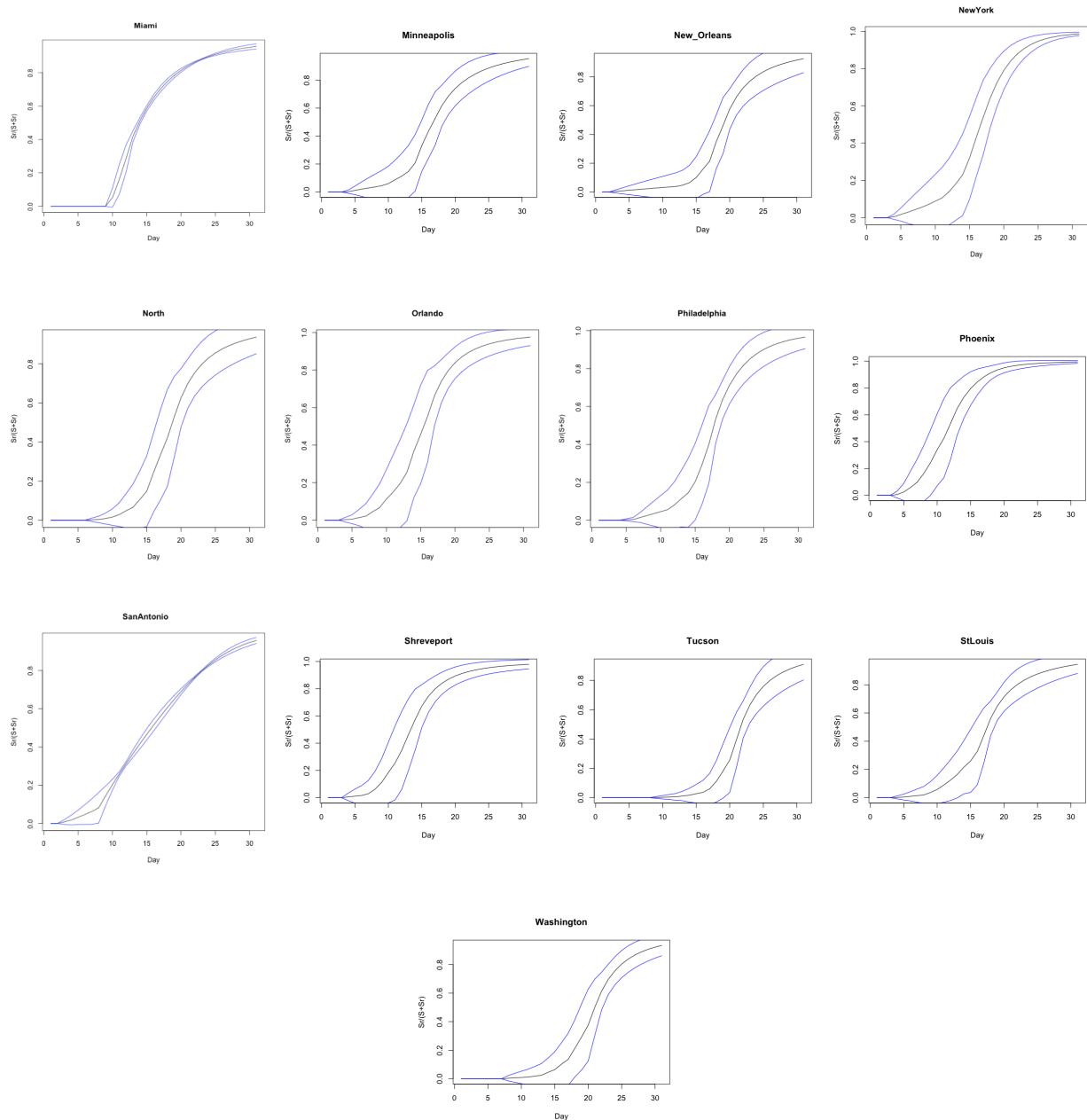


Figure 233: Curve flattening index (best 20 fits).