



*Research article*

**Analysis coronavirus disease (COVID-19) model using numerical approaches and logistic model**

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# Appendices

**Table A1.** The numerical approximate solutions of S, E, I and A using Euler's method.

Time	S	E	I	A
0	11081000	105.1	27.679	53.839
10	10656749.62	544.3334764	163.3864655	52.59018403
20	10153252.5	1041.109911	317.7228175	94.93345581
30	9353964.07	1851.913107	583.4630835	174.1789187
40	8228565.551	2943.421152	968.0035999	295.2260229
50	7008458.823	3989.038808	1381.437691	438.895704
60	6081922.358	4593.635513	1666.342353	557.4563997
70	5613129.717	4732.074244	1764.446289	617.6108371
80	5476295.832	4651.230921	1750.601271	629.338093
90	5489355.198	4539.856324	1708.549743	619.987211
100	5539286.227	4463.331376	1675.211706	607.8721882
110	5580111.154	4424.692169	1656.788046	599.4886724
120	5602412.966	4409.882239	1649.026327	595.1768038
130	5610659.2	4405.724839	1646.601746	593.4434686
140	5611593.485	4404.300564	1645.925345	592.8626387
150	5610026.793	4402.23526	1645.274584	592.5749941
160	5608342.819	4398.786965	1644.134179	592.2160598
170	5607287.909	4394.275684	1642.543125	591.706851
180	5606837.777	4389.209671	1640.688388	591.0827367
190	5606751.195	4383.955314	1638.727886	590.398939
200	5606816.655	4378.695382	1636.749792	589.6950967

**Table A2.** The numerical approximate solutions of Sq, Eq, H and R using Euler's method.

Time	Sq	Eq	H	R
0	739	1.1642	1	2
10	424059.8065	0.280162127	504.0615367	445.8922832
20	926028.9388	0.078462776	3560.164445	3025.249133
30	1722595.228	0.04096072	8486.312747	10839.62557
40	2843652.539	0.045044478	15527.63743	26477.00496
50	4057879.168	0.057625522	24526.5544	52863.48613
60	4977705.25	0.066313317	33156.06896	91258.62859
70	5439677.43	0.068770308	38707.35418	139248.4467
80	5569866.909	0.067894291	40754.08444	192185.4334
90	5550340.11	0.066359023	40724.373	246281.6995
100	5494048.585	0.065224317	40040.98254	299791.3709
110	5446911.719	0.064617709	39415.49367	352392.3727
120	5418313.981	0.06436828	39032.04627	404321.6701
130	5403775.019	0.064289831	38849.23548	455884.6595
140	5396549.042	0.064262617	38777.71761	507288.0654
150	5391826.89	0.064231846	38748.6788	558630.3824
160	5387227.144	0.064182839	38725.65135	609940.6355
170	5382004.989	0.064118383	38695.65662	661216.3557
180	5376185.427	0.06404532	38657.61265	712446.836
190	5370009.878	0.063969025	38614.34368	763623.1331
200	5363689.815	0.063892362	38568.72397	814740.3154

**Table A3.** The numerical approximate solutions of S, E, I and A using RK2.

Time	S	E	I	A
0	11081000	105.1	27.679	53.839
10	10798818.74	370.8950661	110.9752216	42.66450129
20	10414076.62	754.7384302	227.1640226	70.13705562
30	9756583.068	1432.362536	444.5599162	132.9491694
40	8741315.264	2447.035436	789.8285814	238.7653009
50	7518911.447	3559.325611	1206.487287	377.2404465
60	6467308.073	4347.346211	1546.592154	506.9013751
70	5833046.454	4659.660802	1715.079868	588.4777022
80	5565635.197	4673.358097	1748.575906	619.6885307
90	5503269.616	4589.999321	1725.26051	621.5560592
100	5521643.632	4508.196268	1693.454703	613.2874538
110	5556698.345	4454.20311	1670.002254	604.6658742
120	5584391.249	4425.249713	1656.503723	598.701922
130	5600330.375	4411.824202	1649.906419	595.3392649
140	5607292.415	4405.818809	1646.942883	593.6612999
150	5609198.336	4402.299502	1645.405904	592.8190167
160	5608956.708	4398.952767	1644.153489	592.2747182
170	5608172.123	4395.035944	1642.750264	591.7671336
180	5607507.93	4390.528232	1641.120207	591.2066451
190	5607119.135	4385.629851	1639.320016	590.5853278
200	5606956.563	4380.53718	1637.426067	589.9221527

**Table A4.** The numerical approximate solutions of Sq, Eq, H and R using RK2.

Time	Sq	Eq	H	R
0	739	1.1642	1	2
10	282275.1167	0.340645305	428.6468644	437.8926781
20	665857.5001	0.10733852	2614.576859	2632.027289
30	1321156.109	0.047990502	6383.097941	8894.292855
40	2332674.144	0.042496609	12347.31048	21774.84412
50	3549659.969	0.052816905	20652.30127	44496.8076
60	4594765.44	0.062965478	29460.86954	78944.21756
70	5222226.756	0.067590815	36085.83458	123594.85
80	5482934.162	0.068076717	39472.24258	174445.2701
90	5538762.355	0.06702173	40436.02105	227706.5339
100	5513974.274	0.065867572	40242.0238	281191.0423
110	5472575.483	0.065063348	39740.82526	334103.9632
120	5438571.624	0.064612597	39304.30452	386380.3816
130	5416335.063	0.064394381	39021.01415	438198.78
140	5403081.202	0.064293761	38864.42988	489748.1982
150	5394887.332	0.0642366	38783.31536	541155.9522
160	5388845.568	0.064186068	38736.6809	592487.5232
170	5383352.485	0.064129016	38700.58868	643767.6751
180	5377745.637	0.064063837	38664.35693	695000.649
190	5371870.529	0.063992898	38624.89962	746183.19
200	5365776.55	0.06391892	38582.43971	797310.9798

**Table A5.** The numerical approximate solutions of S, E, I and A using RK4.

Time	S	E	I	A
0	11081000	105.1	27.679	53.839
10	10777403.35	399.266749	117.7677571	43.9081965
20	10367684.74	806.5279651	243.3673471	74.56605635
30	9672339.779	1520.812493	473.5276842	141.5489785
40	8622599.901	2562.431413	830.5802804	251.7047721
50	7399383.721	3659.942767	1246.503041	391.4041845
60	6383624.507	4400.416206	1571.67979	517.5273318
70	5790715.335	4673.098607	1724.110705	593.8126455
80	5550373.093	4669.194761	1748.746845	621.1968999
90	5500965.477	4582.060477	1722.63	621.2746854
100	5523886.462	4501.662305	1690.830077	612.5175434
110	5559580.172	4450.037675	1668.176139	603.9721124
120	5586548.85	4422.967291	1655.442981	598.2309235
130	5601580.25	4410.684623	1649.357072	595.0647803
140	5607865.637	4405.236816	1646.666447	593.5132896
150	5609380.698	4401.919115	1645.24308	592.7360636
160	5608960.788	4398.600243	1644.019184	592.2173164
170	5608120.536	4394.648803	1642.609139	591.7149809
180	5607456.474	4390.09832	1640.963548	591.1518069
190	5607085.113	4385.168478	1639.150145	590.5262246
200	5606939.792	4380.0581	1637.248001	589.8596825

**Table A6.** The numerical approximate solutions of Sq, Eq, H and R using RK4.

Time	Sq	Eq	H	R
0	739	1.1642	1	2
10	303647.6421	0.335699251	446.7957985	453.3445848
20	712126.6684	0.105009855	2795.551484	2807.371981
30	1405137.457	0.047925515	6823.237635	9522.535504
40	2450949.127	0.043643131	13077.81689	23240.1527
50	3668603.044	0.054112364	21549.35879	47104.74759
60	4677805.531	0.063725358	30245.8049	82678.29953
70	5263913.596	0.067816061	36571.46779	128114.094
80	5497567.375	0.06803975	39678.50626	179348.15
90	5540451.511	0.066916221	40475.97914	232720.4769
100	5511125.508	0.065773991	40213.50862	286188.2362
110	5469092.708	0.065000897	39698.34791	339047.3298
120	5435815.502	0.064577042	39269.47247	391273.4427
130	5414487.768	0.064376015	38998.12171	443056.555
140	5401911.128	0.064284231	38851.0643	494584.5711
150	5394108.561	0.064230554	38775.74489	545980.1277
160	5388245.564	0.064180753	38731.92915	597304.3825
170	5382808.713	0.06412335	38696.84515	648579.2303
180	5377202.367	0.0640576	38660.74259	699807.3913
190	5371310.498	0.063986207	38621.10258	750984.9854
200	5365199.96	0.063911959	38578.42327	802107.5453

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**Table A7.** The number of infected people of the COVID-19 in Iraq.

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Date	Infected people
28.03.2020	506
29.03.2020	547
30.03.2020	630
31.03.2020	695
01.04.2020	728
02.04.2020	772
03.04.2020	820
04.04.2020	878
05.04.2020	961
06.04.2020	1031
07.04.2020	1122
08.04.2020	1202

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**Table A8.** The number of infected people of the COVID-19 in Turkey.

Date	Infected people
11.03.2020	1
12.03.2020	1
13.03.2020	5
14.03.2020	6
15.03.2020	18
16.03.2020	47
17.03.2020	98
18.03.2020	191
19.03.2020	359
20.03.2020	670
21.03.2020	947
22.03.2020	1236
23.03.2020	1529
24.03.2020	1872
25.03.2020	2433
26.03.2020	3629



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