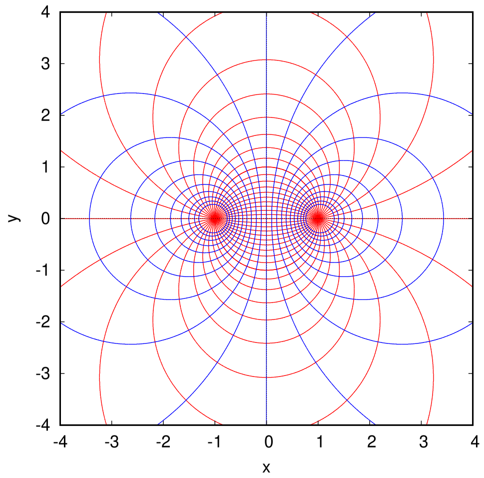
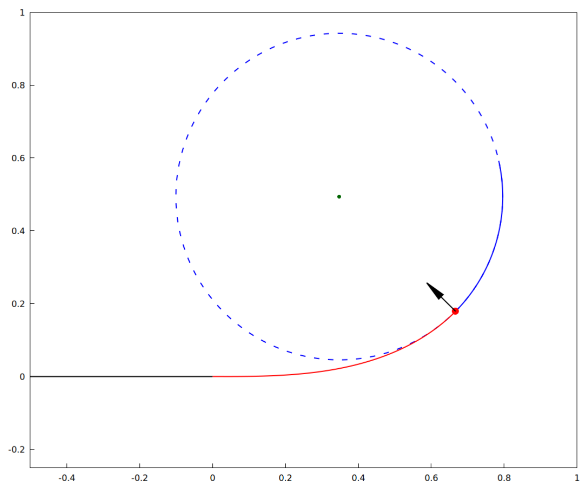
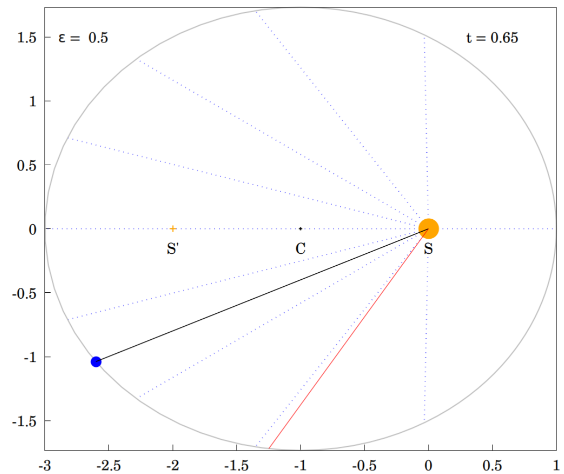
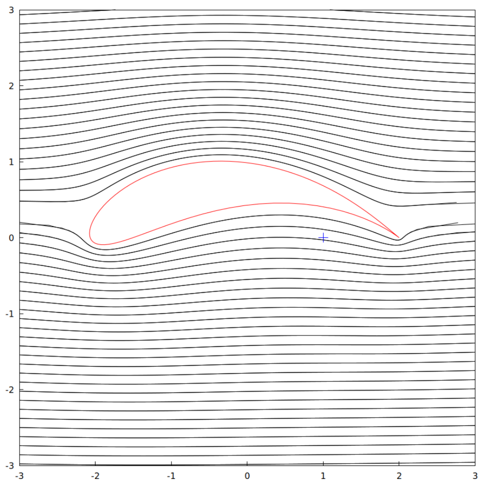
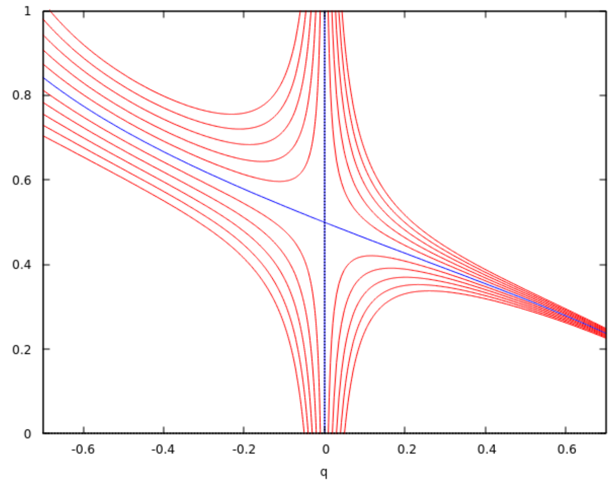
2025 Calendar
Geometry and dynamics

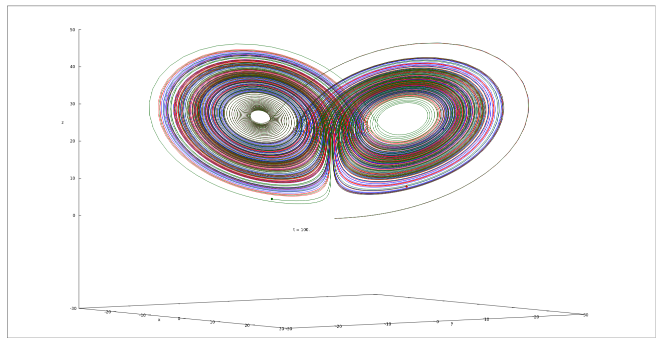




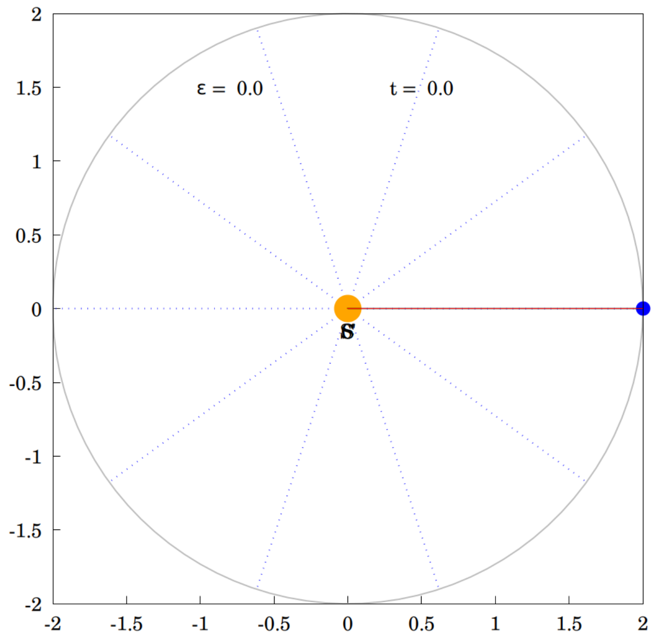


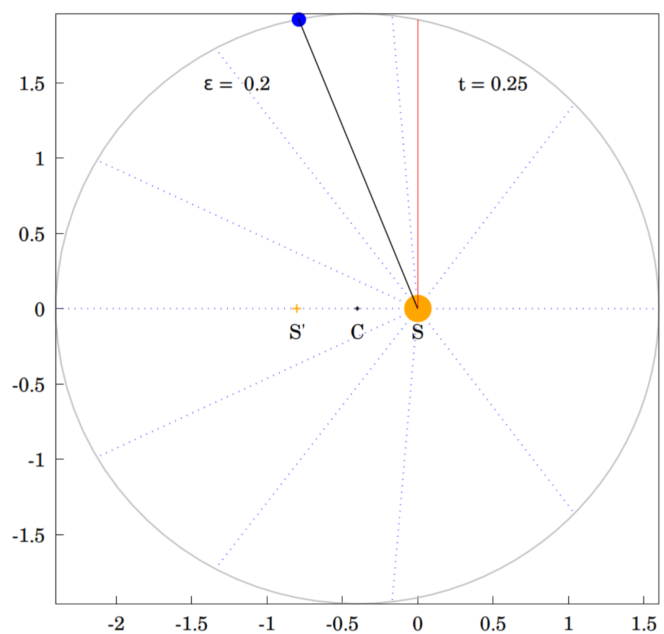


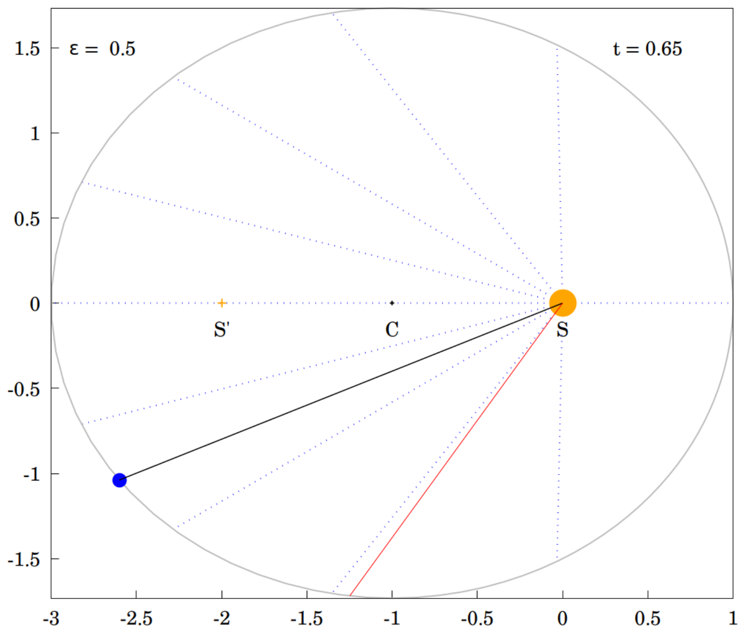


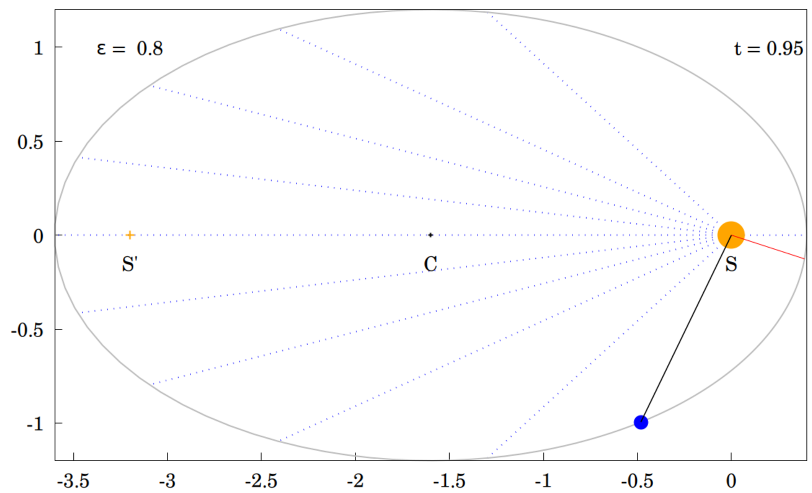


JANUARY 2025





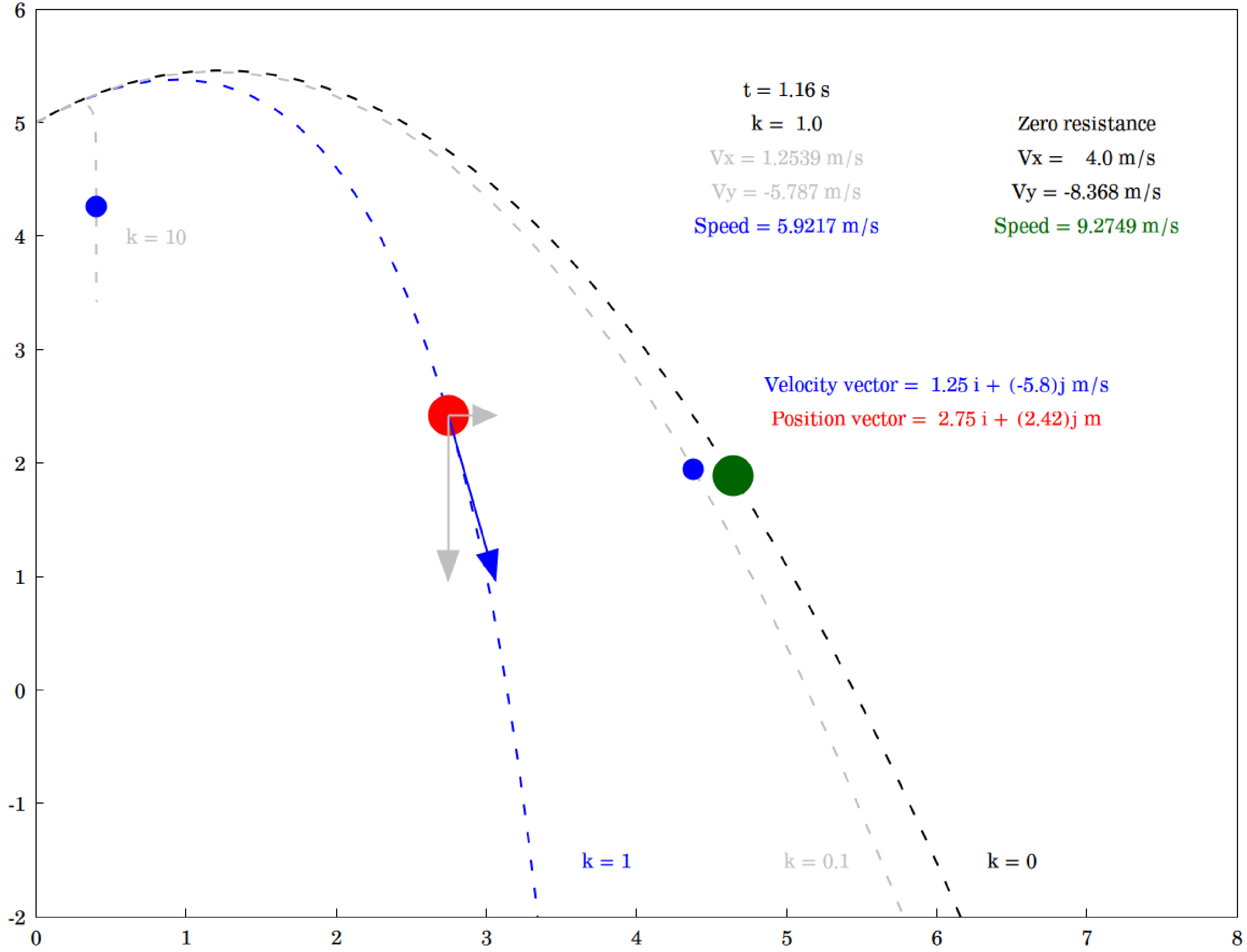




JANUARY 2025

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
30	31	1 New Year's Day 1/364	2 2/363	3 3/362	4 4/361	5 5/360
6 6/359	7 7/358	8 8/357	9 9/356	10 10/355	11 11/354	12 12/353
13 13/352	14 14/351	15 15/350	16 16/349	17 17/348	18 18/347	19 19/346
20 Martin Luther King Day 20/345	21 21/344	22 22/343	23 23/342	24 24/341	25 25/340	26 26/339
27 27/338	28 28/337	29 Chinese New Year (Yi-Si) 29/336	30 30/335	31 31/334	1	2

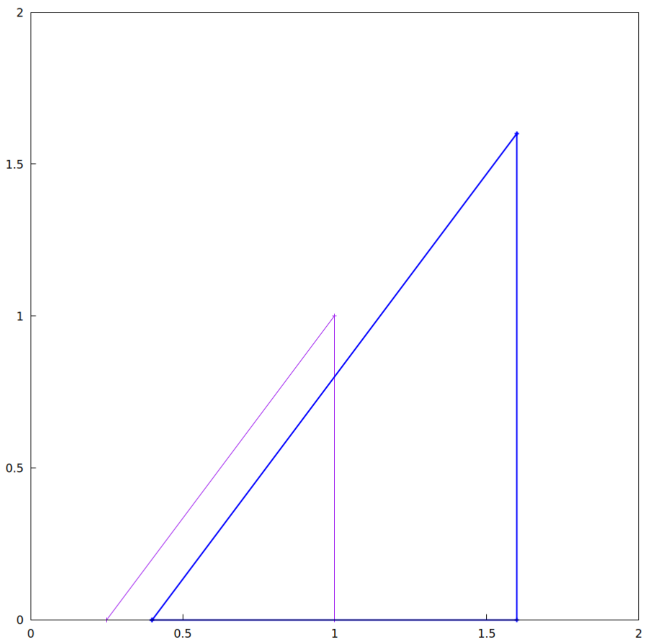
FEBRUARY 2025



FEBRUARY 2025

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
27	28	29	30	31	1 32/333	2 Groundhog Day 33/332
3 34/331	4 35/330	5 36/329	6 37/328	7 38/327	8 39/326	9 40/325
10 41/324	11 42/323	12 43/322	13 44/321	14 Valentine's Day 45/320	15 46/319	16 47/318
17 President's Day 48/317	18 49/316	19 50/315	20 51/314	21 52/313	22 53/312	23 54/311
24 55/310	25 56/309	26 57/308	27 58/307	28 59/306	1	2

MARCH 2025



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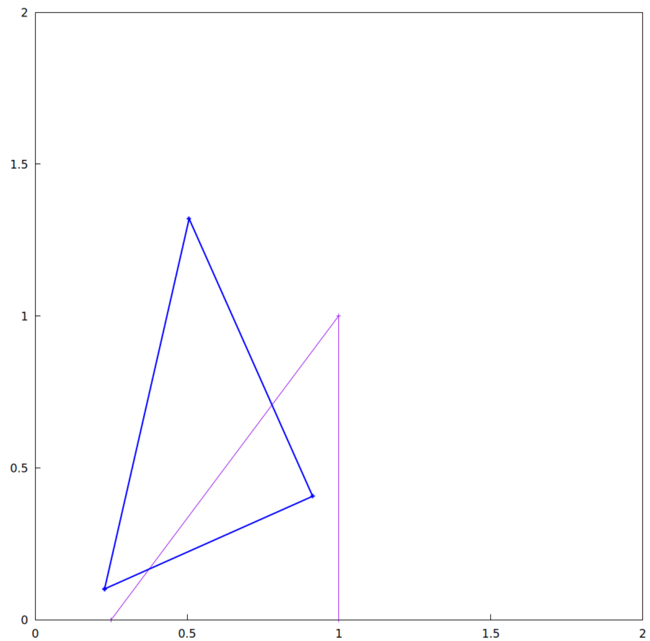

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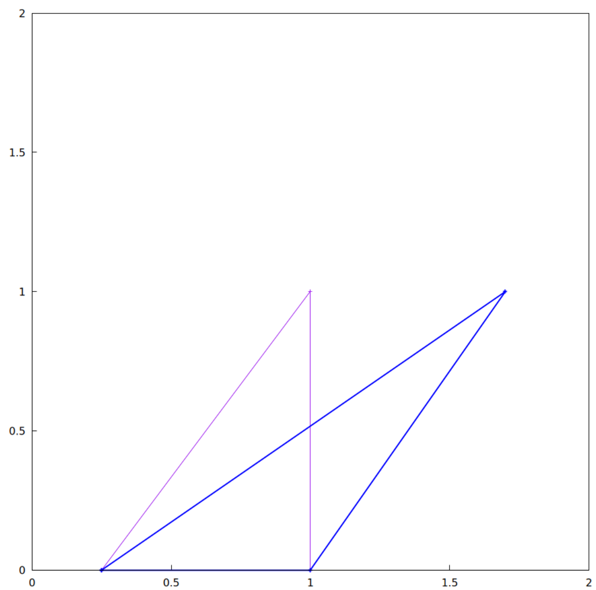

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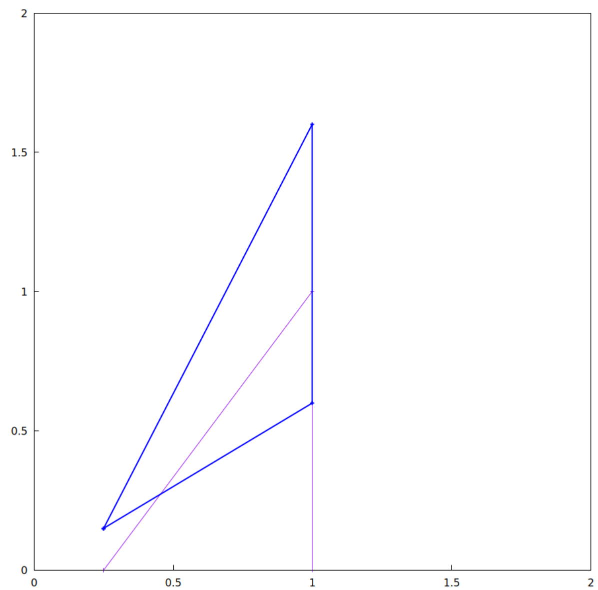

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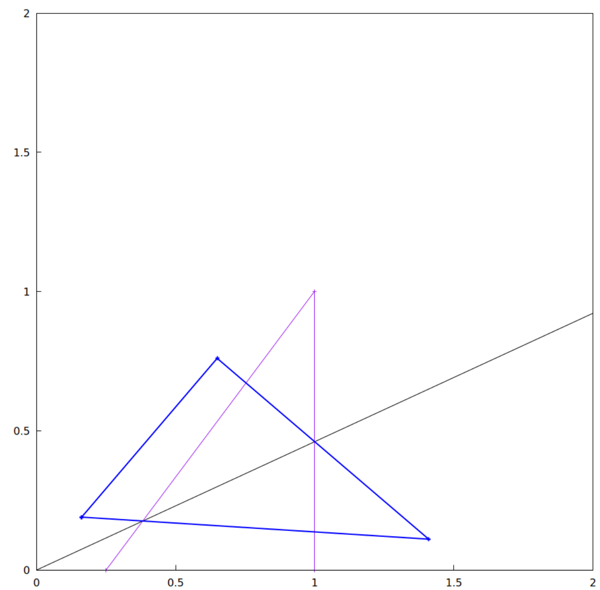

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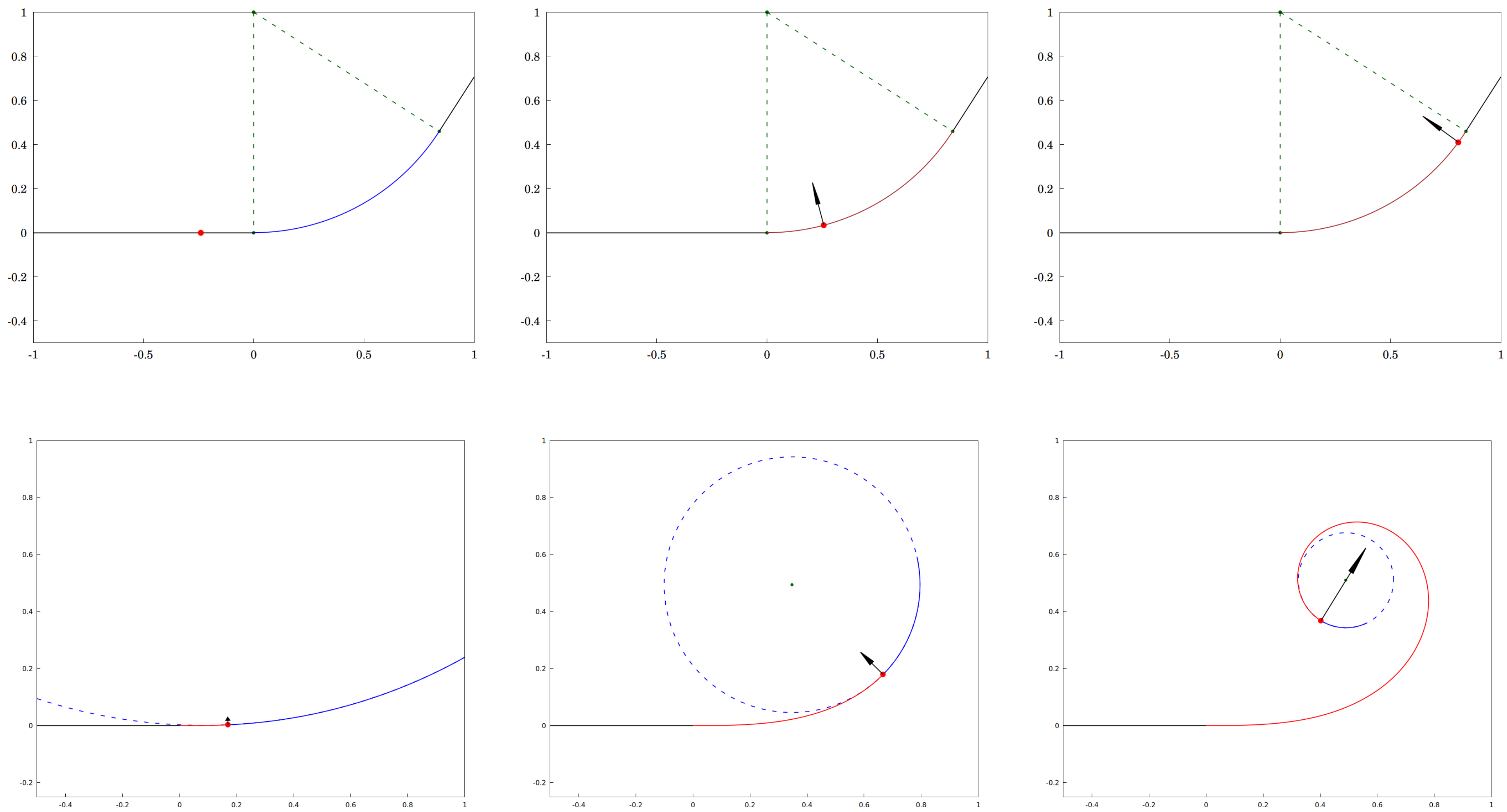
MARCH 2025

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
24	25	26	27	28	1 Ramadan Begins 60/305	2 61/304
3 62/303	4 63/302	5 Ash Wednesday 64/301	6 65/300	7 66/299	8 67/298	9 68/297
10 69/296	11 70/295	12 71/294	13 72/293	14 73/292	15 74/291	16 75/290
17 St. Patrick's Day 76/289	18 77/288	19 78/287	20 Vernal Equinox 9:01am (GMT) 79/286	21 Bahá'í New Year (Naw-Ruz) 182 80/285	22 81/284	23 82/283
24 83/282	25 84/281	26 85/280	27 86/279	28 87/278	29 88/277	30 Daylight Saving Time Begins 1:00am (GMT) 89/276
31 90/275	1	2	3	4	5	6

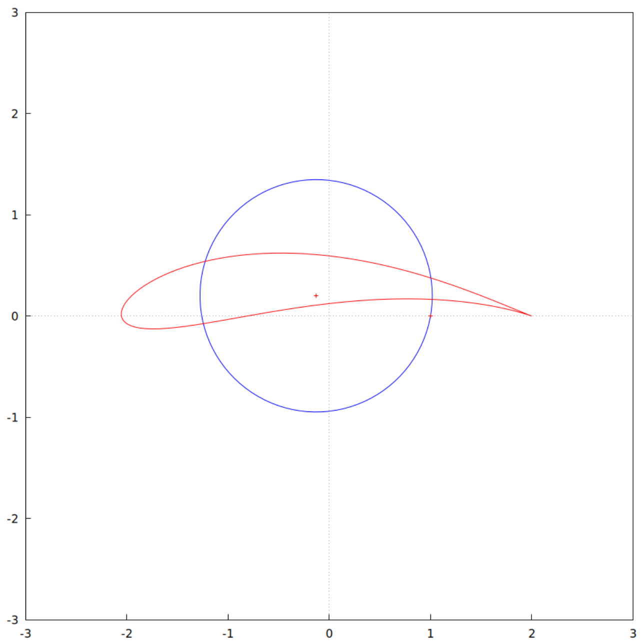
APRIL 2025



APRIL 2025

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
31	1 April Fools' Day 91/274	2 92/273	3 93/272	4 94/271	5 95/270	6 96/269
7 97/268	8 98/267	9 99/266	10 100/265	11 101/264	12 102/263	13 Passover 103/262
14 104/261	15 105/260	16 106/259	17 107/258	18 Good Friday 108/257	19 109/256	20 Easter Sunday 110/255
21 First Day of Ridvan 111/254	22 112/253	23 113/252	24 114/251	25 115/250	26 116/249	27 117/248
28 118/247	29 Ninth Day of Ridvan 119/246	30 120/245	1	2	3	4

MAY 2025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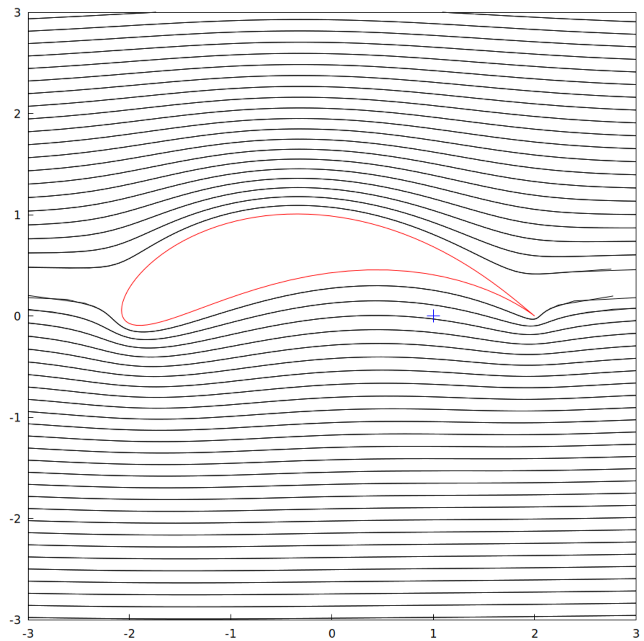
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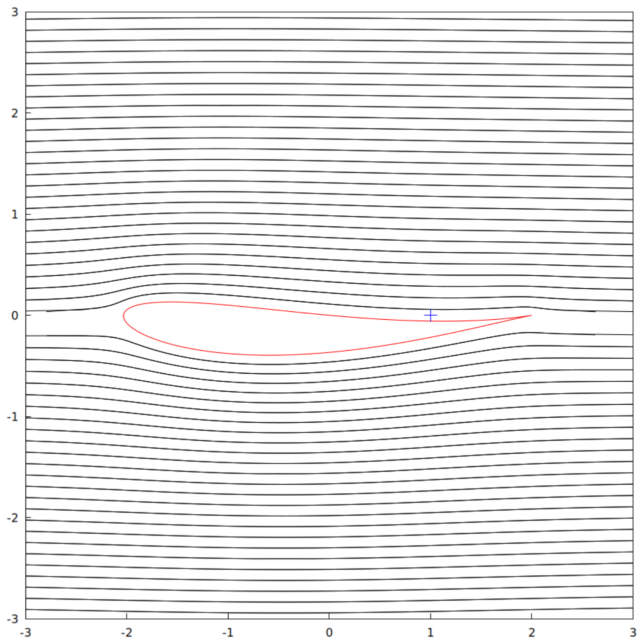
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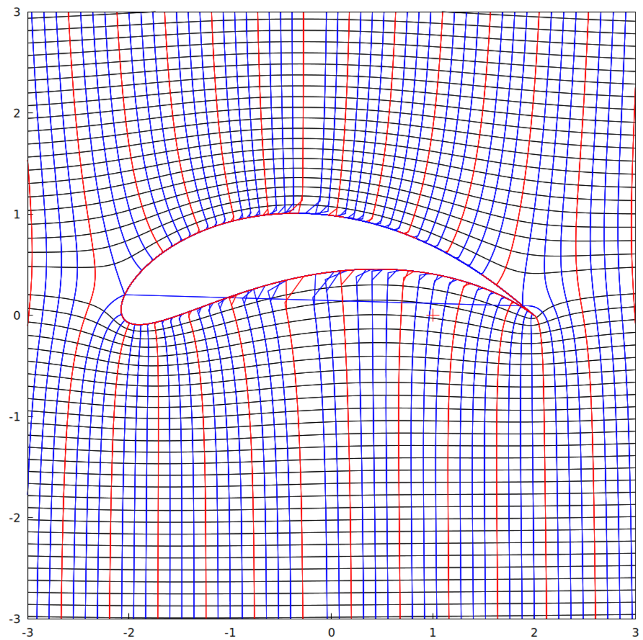
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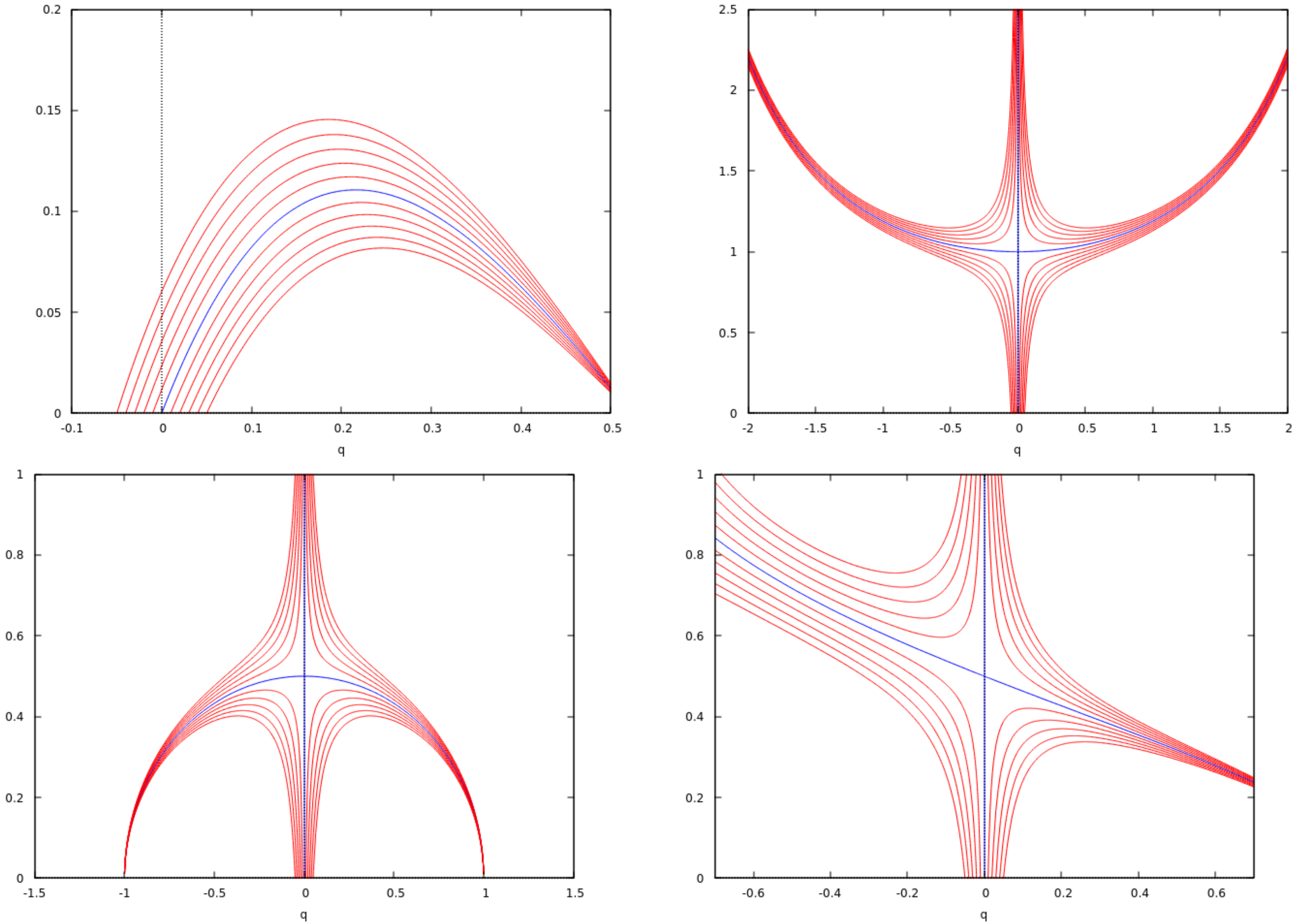
MAY 2025

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
28	29	30	1 121/244	2 Twelfth Day of Ridvan 122/243	3 123/242	4 124/241
5 125/240	6 126/239	7 127/238	8 128/237	9 129/236	10 130/235	11 Mother's Day 131/234
12 132/233	13 133/232	14 134/231	15 135/230	16 136/229	17 137/228	18 138/227
19 139/226	20 140/225	21 141/224	22 142/223	23 Declaration of the Báb 143/222	24 144/221	25 145/220
26 Memorial Day 146/219	27 147/218	28 148/217	29 Ascension of Bahá'u'lláh 149/216	30 150/215	31 151/214	1

JUNE 2025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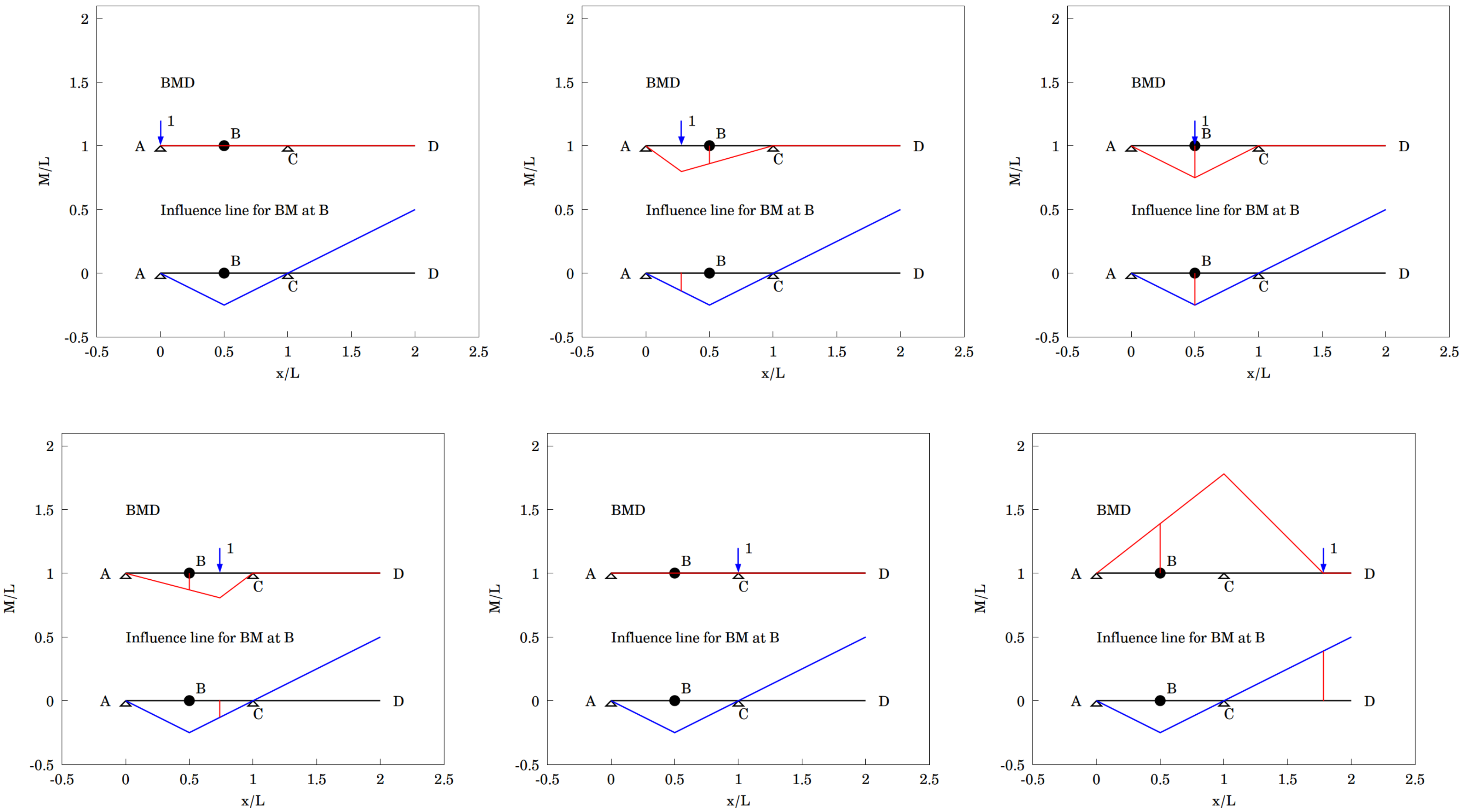
JUNE 2025

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
26	27	28	29	20	31	1 152/213
2 Shavuot 153/212	3 154/211	4 155/210	5 156/209	6 157/208	7 158/207	8 159/206
9 160/205	10 161/204	11 162/203	12 163/202	13 164/201	14 Flag Day 165/200	15 Father's Day 166/199
16 167/198	17 168/197	18 169/196	19 170/195	20 171/194	21 Summer Solstice 3:41am (BST) 172/193	22 173/192
23 174/191	24 175/190	25 176/189	26 177/188	27 Islamic New Year 1447 178/187	28 179/186	29 180/185
30 181/184	1	2	3	4	5	6

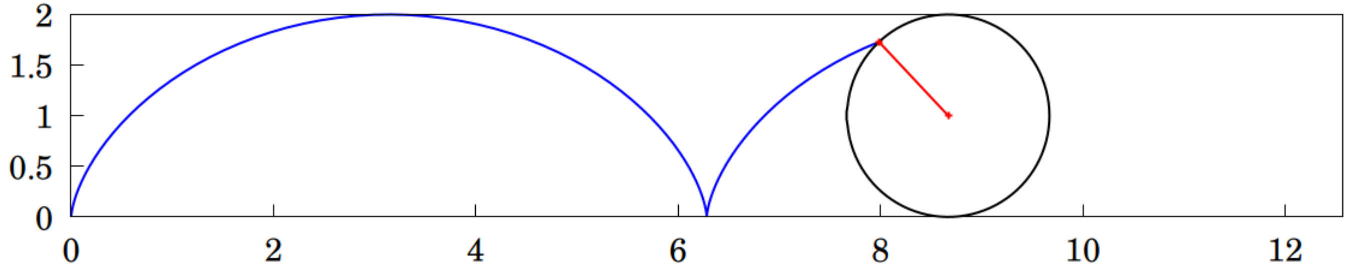
JULY 2025

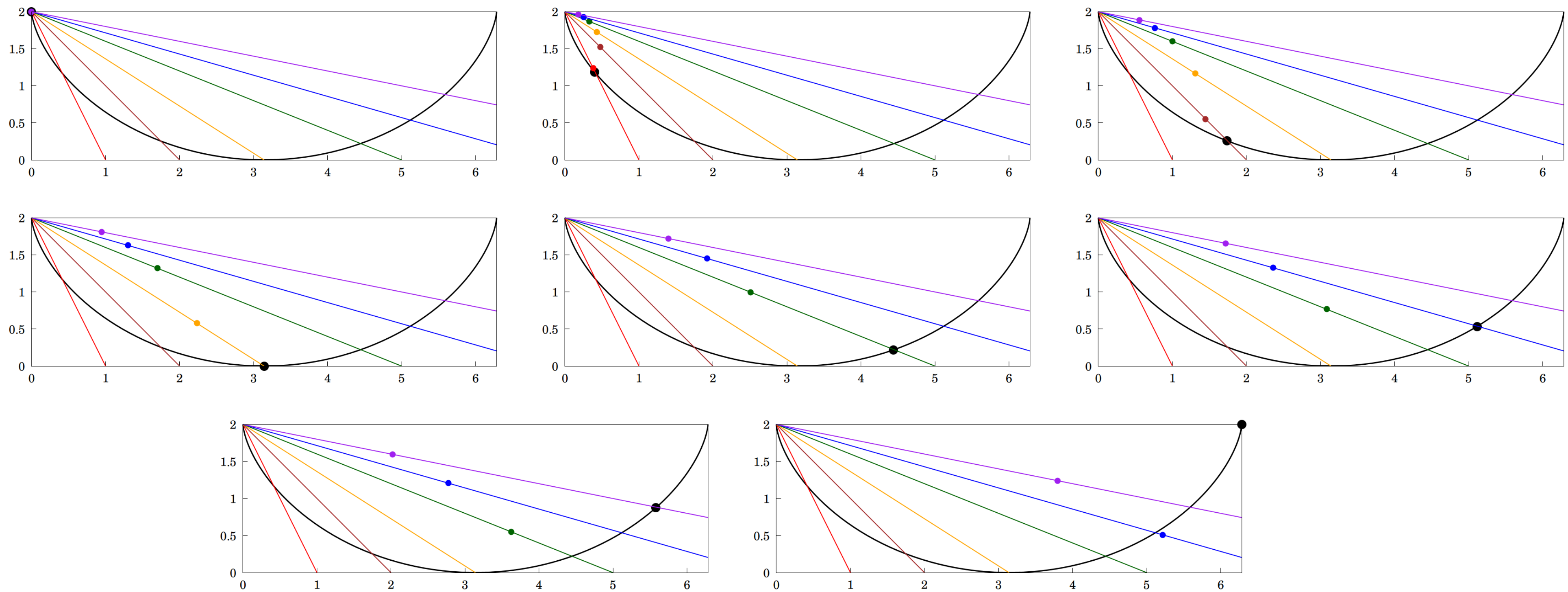


JULY 2025

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
30	1 182/183	2 183/182	3 184/181	4 Independence Day 185/180	5 186/179	6 187/178
7 188/177	8 189/176	9 Martyrdom of the Báb 190/175	10 191/174	11 192/173	12 193/172	13 194/171
14 195/170	15 196/169	16 197/168	17 198/167	18 199/166	19 200/165	20 201/164
21 202/163	22 203/162	23 204/161	24 205/160	25 206/159	26 207/158	27 208/157
28 209/156	29 210/155	30 211/154	31 212/153	1	2	3

AUGUST 2025

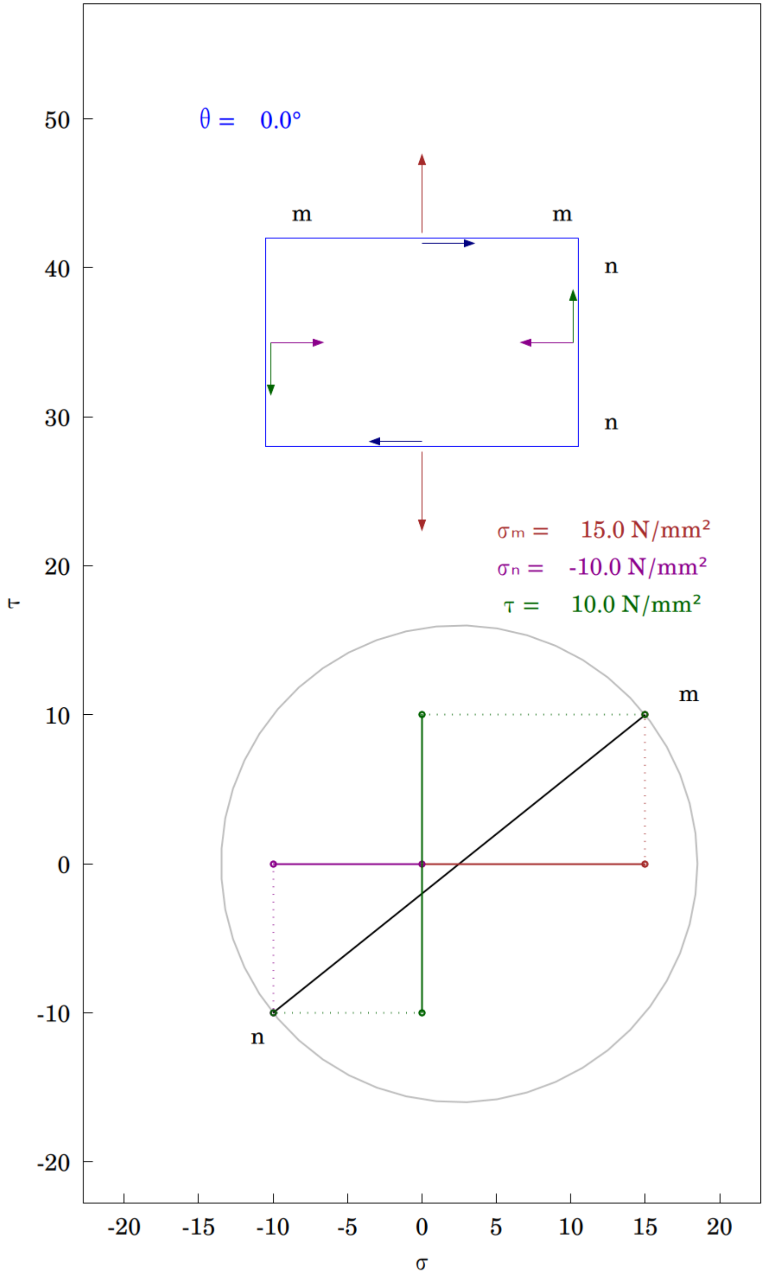


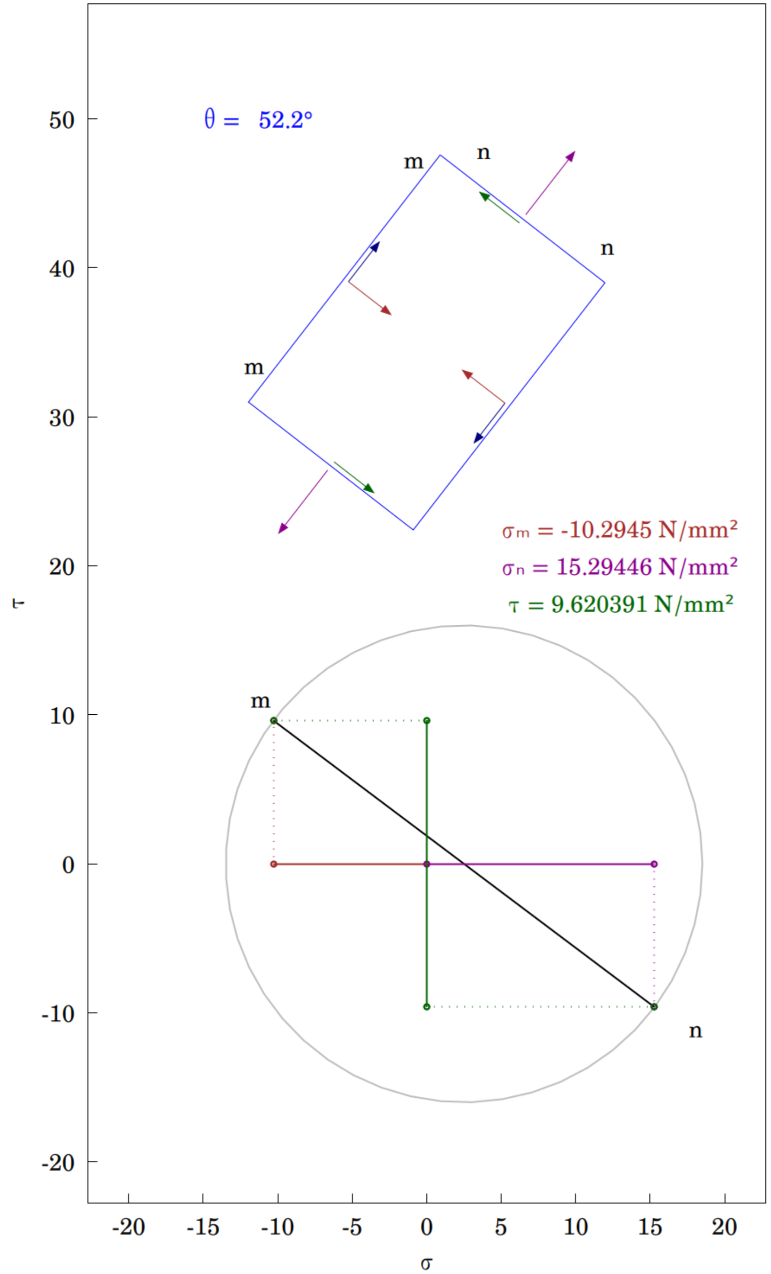


AUGUST 2025

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
28	29	30	31	1 213/152	2 214/151	3 215/150
4 216/149	5 217/148	6 218/147	7 219/146	8 220/145	9 221/144	10 222/143
11 223/142	12 224/141	13 225/140	14 226/139	15 227/138	16 228/137	17 229/136
18 230/135	19 231/134	20 232/133	21 233/132	22 234/131	23 235/130	24 236/129
25 237/128	26 238/127	27 239/126	28 240/125	29 241/124	30 242/123	31 243/122

SEPTEMBER 2025

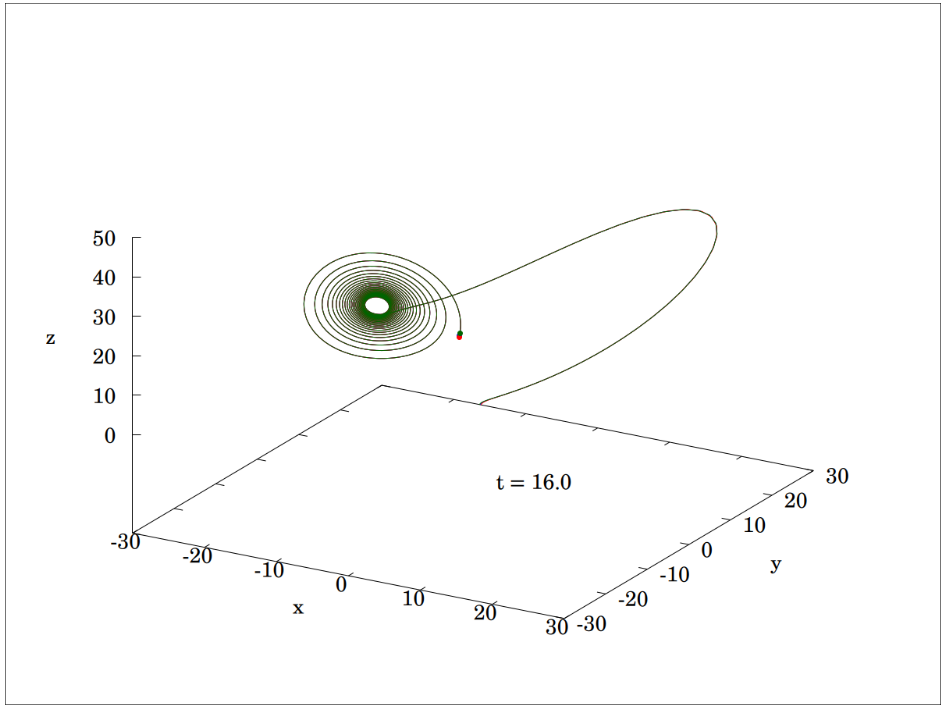


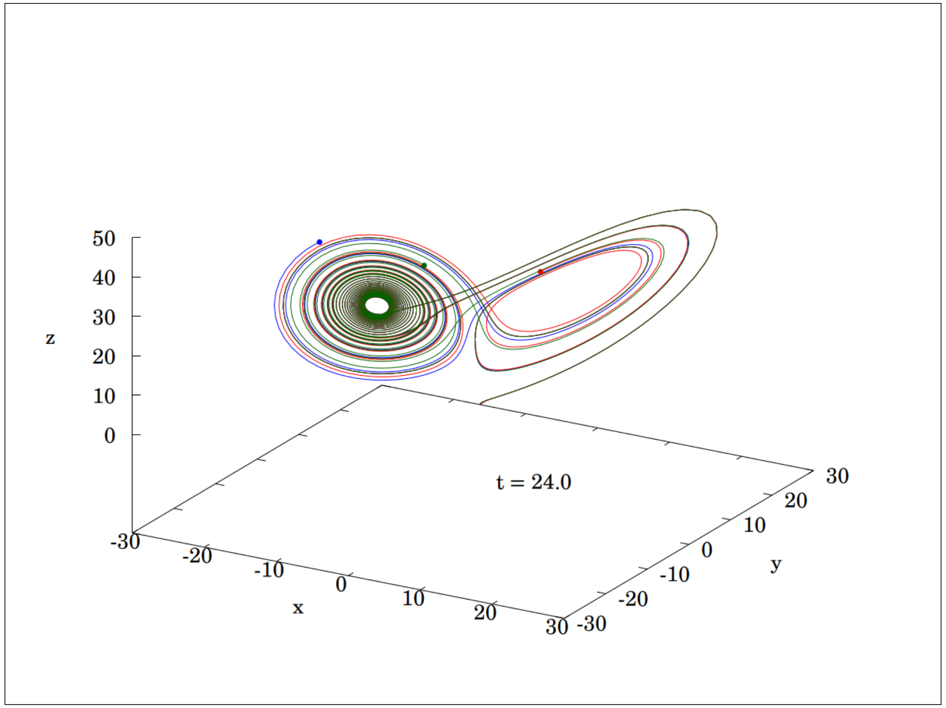


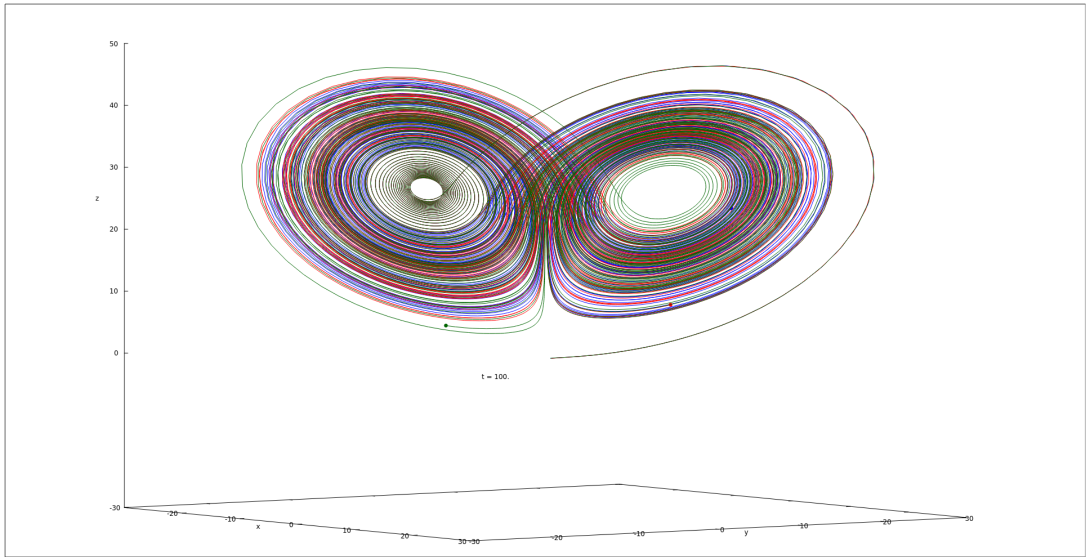
SEPTEMBER 2025

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
1 Labor Day 244/121	2 245/120	3 246/119	4 247/118	5 248/117	6 249/116	7 250/115
8 251/114	9 252/113	10 253/112	11 254/111	12 255/110	13 256/109	14 257/108
15 258/107	16 259/106	17 260/105	18 261/104	19 262/103	20 263/102	21 264/101
22 Autumnal Equinox 7:18pm (BST) 265/100	23 Rosh HaShanah 5786 266/99	24 267/98	25 268/97	26 269/96	27 270/95	28 271/94
29 272/93	30 273/92	1	2	3	4	5

OCTOBER 2025



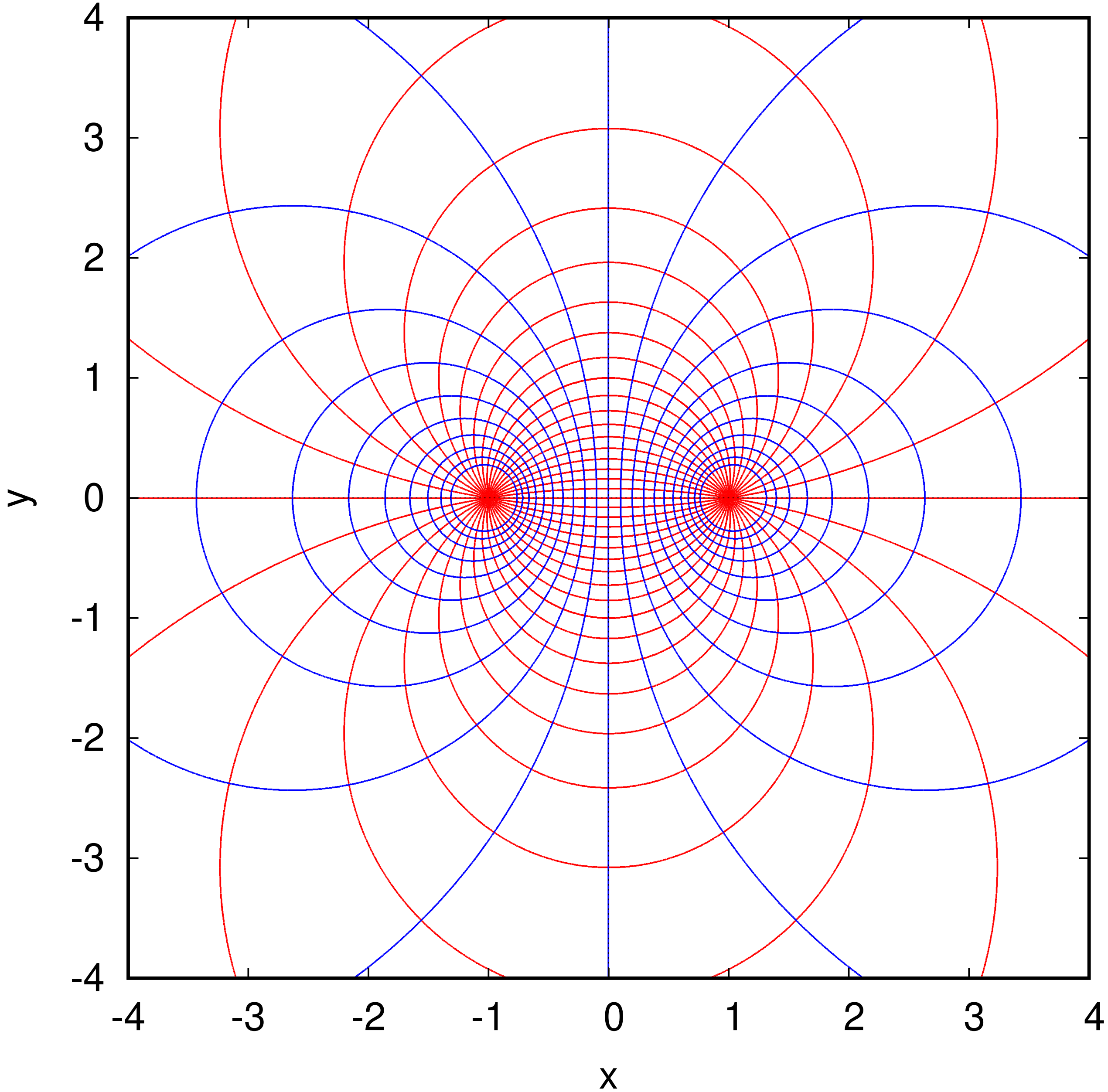




OCTOBER 2025

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
29	30	1 274/91	2 Yom Kippur 275/90	3 276/89	4 277/88	5 278/87
6 279/86	7 Sukkot 280/85	8 281/84	9 282/83	10 283/82	11 284/81	12 285/80
13 Columbus Day 286/79	14 Shemini Atzeret 287/78	15 Simchat Torah 288/77	16 289/76	17 290/75	18 291/74	19 292/73
20 Birth of the Báb 293/72	21 294/71	22 295/70	23 296/69	24 297/68	25 298/67	26 Daylight Saving Time Ends 2:00am (BST) 299/66
27 300/65	28 301/64	29 302/63	30 303/62	31 Halloween 304/61	1	2

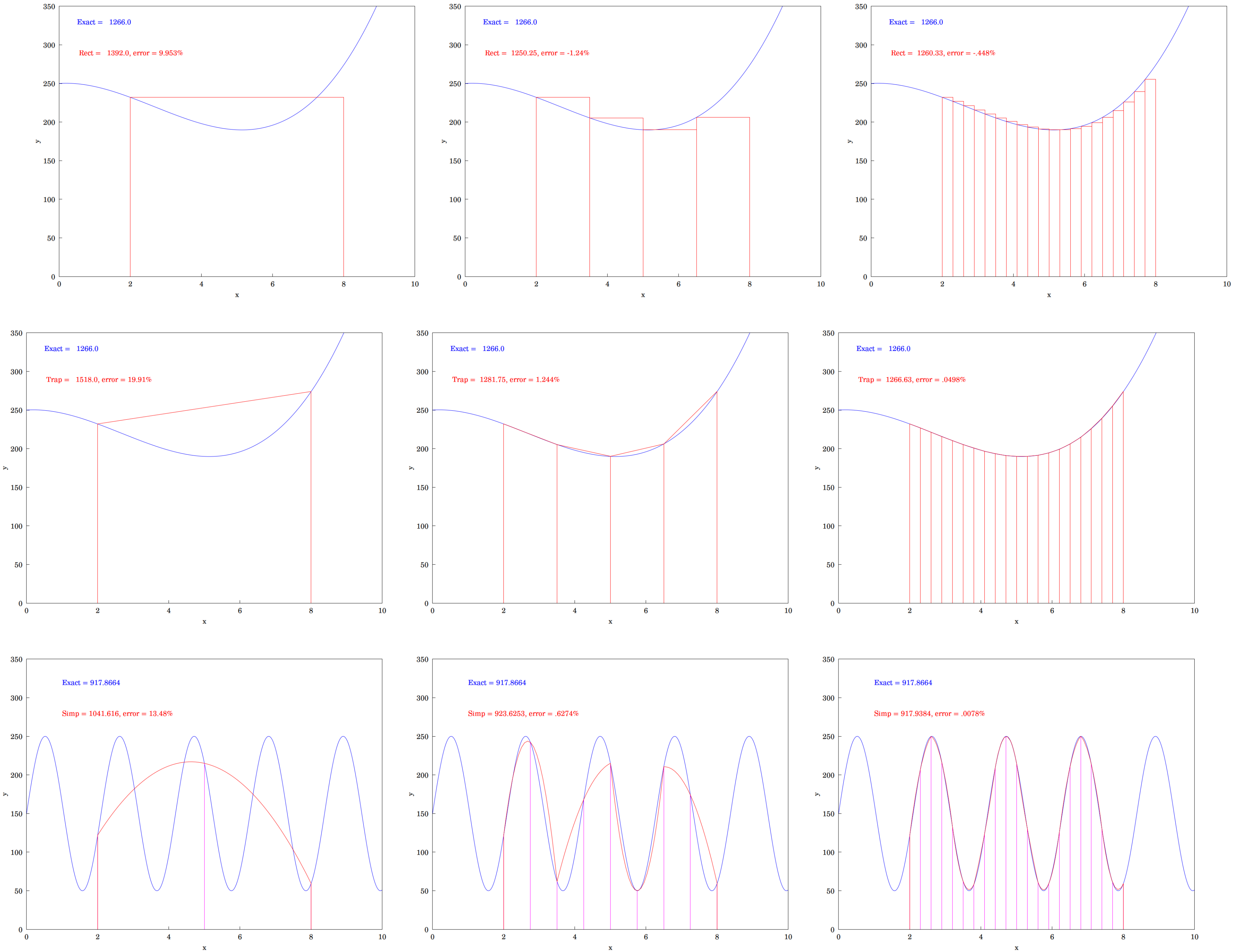
NOVEMBER 2025



NOVEMBER 2025

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
27	28	29	30	31	1 305/60	2 306/59
3 307/58	4 308/57	5 309/56	6 310/55	7 311/54	8 312/53	9 313/52
10 314/51	11 Veteran's Day 315/50	12 Birth of Bahá'u'lláh 316/49	13 317/48	14 318/47	15 319/46	16 320/45
17 321/44	18 322/43	19 323/42	20 324/41	21 325/40	22 326/39	23 327/38
24 328/37	25 329/36	26 330/35	27 Thanksgiving 331/34	28 332/33	29 333/32	30 334/31

DECEMBER 2025



DECEMBER 2025

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
1 335/30	2 336/29	3 337/28	4 338/27	5 339/26	6 340/25	7 341/24
8 342/23	9 343/22	10 344/21	11 345/20	12 346/19	13 347/18	14 348/17
15 Hanukkah 349/16	16 350/15	17 351/14	18 352/13	19 353/12	20 354/11	21 Winter Solstice 3:02pm (GMT) 355/10
22 356/9	23 357/8	24 358/7	25 Christmas 359/6	26 360/5	27 361/4	28 362/3
29 363/2	30 364/1	31 365/0	1	2	3	4

Afterword

These illustrations are ones that I produced over a period of years for a range of reasons. Some are technically challenging, some are useful visualizations but which I have not seen others having made before, and some just look pretty. Most are individual frames from interactive animations that I have produced and many can be found in the WIKIPEDIA pages cited below. They and this calendar have been produced using only free software throughout, including the operating system of the computer used to produce them.

Captions

January Kepler's first and second laws of planetary motion (`https://en.wikipedia.org/wiki/Kepler%27s_laws_of_planetary_motion`). The first law states that a planet orbits a star in an elliptical orbit with the star at one of the ellipse's foci. The second law states that the planet moves along the orbit such that sectors of equal area are swept in equal intervals. Equal-area sectors are marked out in orbits shown for various eccentricities.

February Projectiles in fluids. This figure shows four projectiles thrown at the same initial velocity but moving through fluids of differing viscosities, denoted by k, where resistance to motion which is proportional to its velocity. The case of moving through an inviscid fluid ($k = 0$) is also shown. In all but the inviscid case, the particle will eventually attain a downwards *terminal velocity*.

March Transformations in the cartesian plane. (i) Dilation with respect to the origin; (ii) Rotation about the origin; (iii) Shearing about the x-axis; (iv) Shearing about the y-axis; (v) Reflection about a straight line passing through the origin.

April The top row of images show a vehicle moving at constant speed initially on a straight path (no acceleration) which encounters a circular arc and thus requires the sudden application of a centripetal force. This is an uncomfortable experience for passengers. In the second row, the straight segment is connected to the circular arc via a *transition curve* in the form of a *clothoid* or *Cornu spiral*. Here, the curvature increases linearly from zero with distance travelled along the spiral and so does the centripetal force (`https://en.wikipedia.org/wiki/Track_transition_curve`).

May The *Zhukovsky transform* and *aerofoil*. In the complex plane, an eccentric circle, passing through the point $z = 1$, is transformed using the mapping $w \to z + 1/z$. This transforms the circle (blue) into an aerofoil shape (red). Using analytic function theory, the potential flow around the circle is also transformed as shown (`https://en.wikipedia.org/wiki/Joukowsky_transform`). The final figure also shows the equipotential lines, which are always orthogonal to the streamlines (some numerical anomalies exist in the figure).

June The four fundamental type of bifurcations for a nonlinear single degree of freedom system. (i) The saddle-node bifurcation (limit point); (ii) The supercritical pitchfork bifurcation; (iii) The subcritical bifurcation; (iv) The transcritical bifurcation. The perfect systems (unperturbed behaviour) are shown in blue, the perturbed cases are shown in red. Applications include structural buckling theory (`https://en.wikipedia.org/wiki/Buckling`).

July Influence lines. In a structure, the variation of bending moment is shown at the top of each figure as a unit force (load) moves along it. The influence line (blue) is a useful tool for assessing how, say the bending moment at a single point (B), changes with the variation of the load's position (`https://en.wikipedia.org/wiki/Influence_line`).

August The *Brachistochrone curve*. For two points in a uniform gravitaional field, which path provides the route with the shortest travel time? This is the Brachistochrone problem. Perhaps surprisingly, the straight-line path is not the fastest route. The fastest is provided by the *cycloid*, the locus of a point on a rolling circle. In this demonstration, the particle on the cycloid beats each of the particles moving on a straight-line path to each respective intercept on the curve (`https://en.wikipedia.org/wiki/Brachistochrone_curve`).

September *Stress* and *Mohr's circle*. In two dimensional stress, a rectangular element in general encounters *direct stress* and *shear stress*. What happens when you change the orientation of the rectangle? It transforms according to the laws of second-order tensors. A very useful way of calculating the components is to use Mohr's circle, which was used a long time before computers made the job easy. However, even today, this technique is very handy for engineers (`https://en.wikipedia.org/wiki/Mohr%27s_circle`).

October The *Lorenz system* and *chaos theory*. The Lorenz system is a set of three ordinary differential equations which are a simplified model of atmospheric dynamics. Even this basic model has the hallmarks of chaos in that trajectories which start off very close to each other soon lose correlation and yet they remain bounded. In the figure, three trajectories shown in red, green and blue start off as being almost indistinguishable but after a while diverge wildly. They eventually trace out the Lorenz *strange attractor* (`https://en.wikipedia.org/wiki/Lorenz_system`).

November The *Bipolar coordinate system*. This is an example of a curvilinear, orthogonal coordinate system. The cartesian coordinate system the most common system, being both linear and orthogonal. Another orthogonal system is the polar coordinate system, in which the radial component is still linear. The bipolar system has some application in problems of mechanics (`https://en.wikipedia.org/wiki/Bipolar_coordinates`).

December Numerical integration visualized. The three most common numerical integration techniques to find the area between a curve and the x-axis are shown. The top row shows the *rectangular method*, where the interval is split into rectangles of equal width. As the number of rectangles increases, the sum of their areas converges to the area of the curve. The second row shows the *trapezium rule* where the interval is split into a set of trapezia. The converges of this method is significantly better than the rectangular method. The bottom line shows *Simpson's rule* applied to another integral. Here, the interval is split into sets of quadratic parabolas and the convergence rate is the best of the three methods.

Colophon

The figures and diagrams were all produced in WXMAXIMA on a GNU/LINUX system. The data for the calendar was produced by the GNU EMACS `calendar` function, which can directly output LaTeX source files. This was then edited and a PDF document was produced by PDFLaTeX using the PALLATINO font family. Finally, printing was handled by CUPS.