Arctan problem: adaptive BS23 vs references
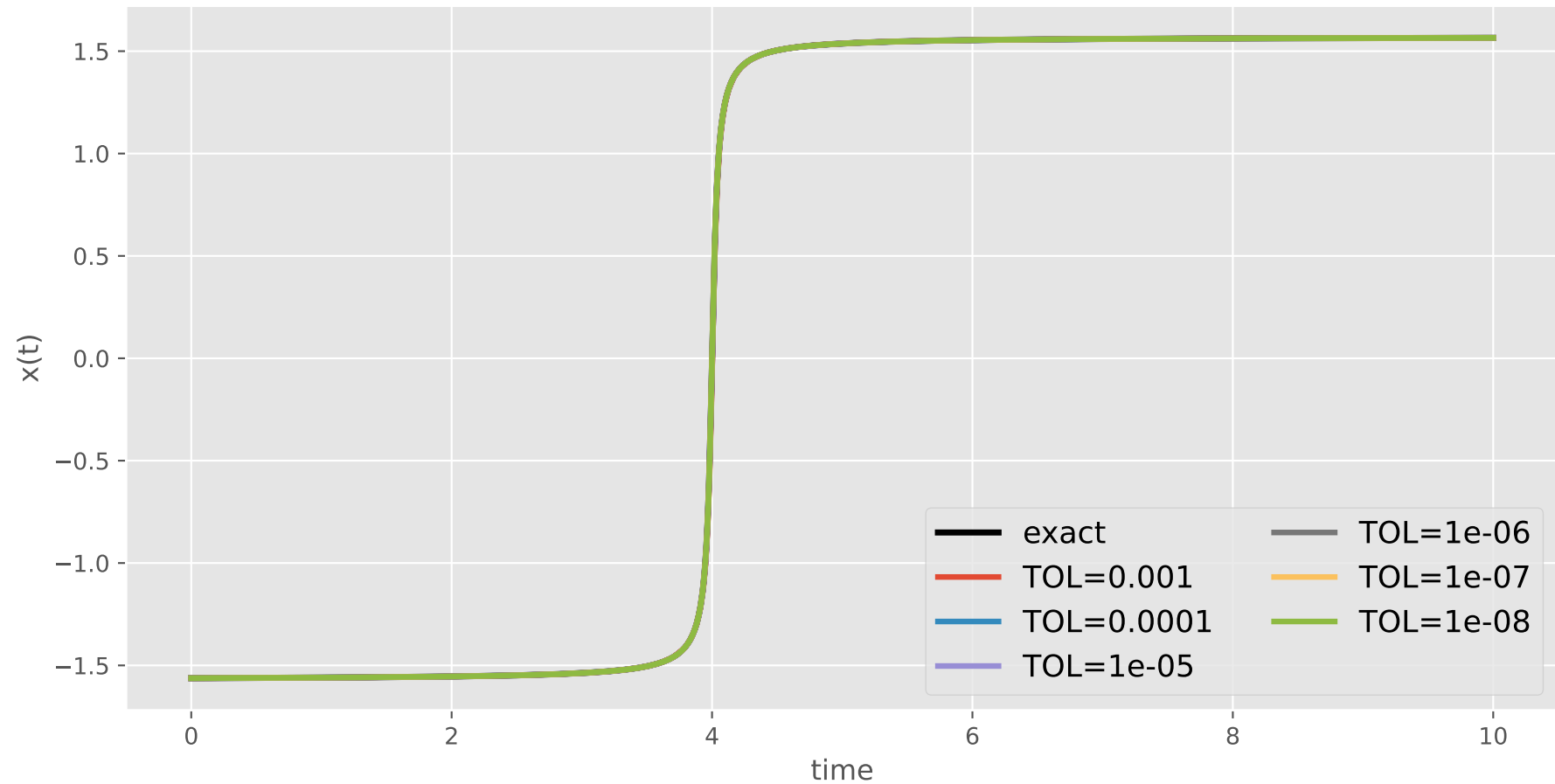
- exact
- explicit Euler (tau=0.1)
- Bogacki–Shampine low (tau=0.1)
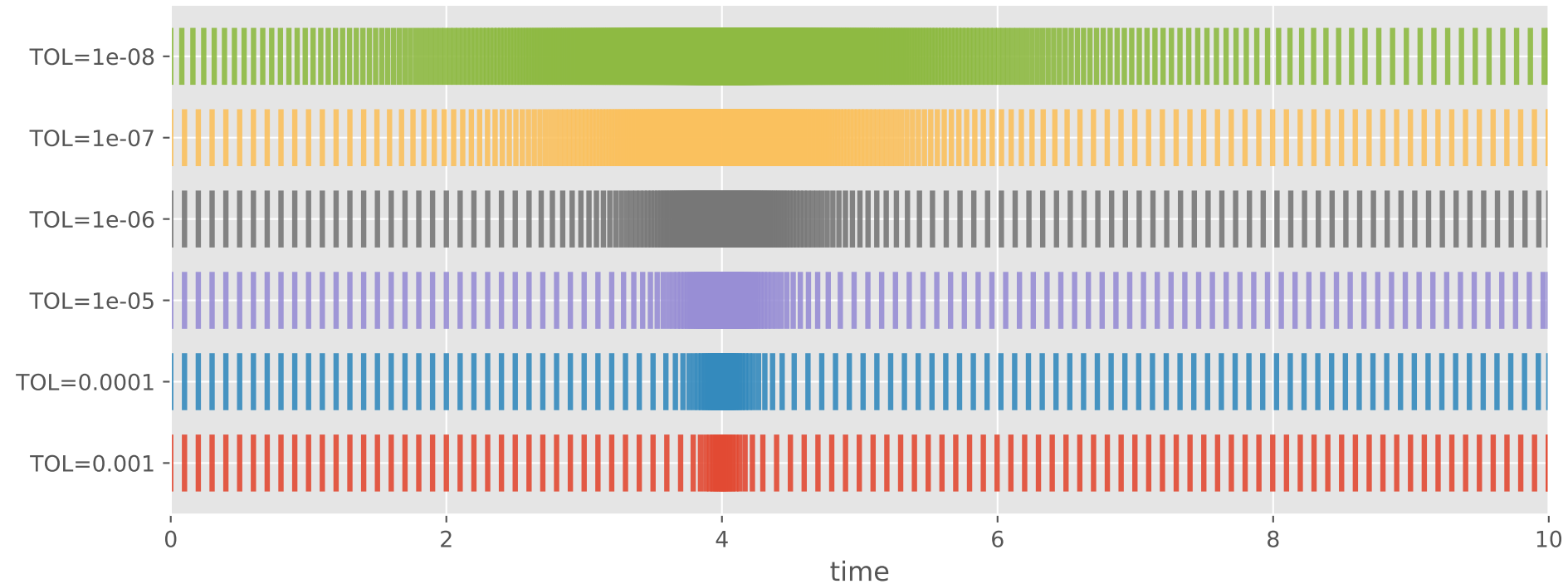- adaptive embedded RK
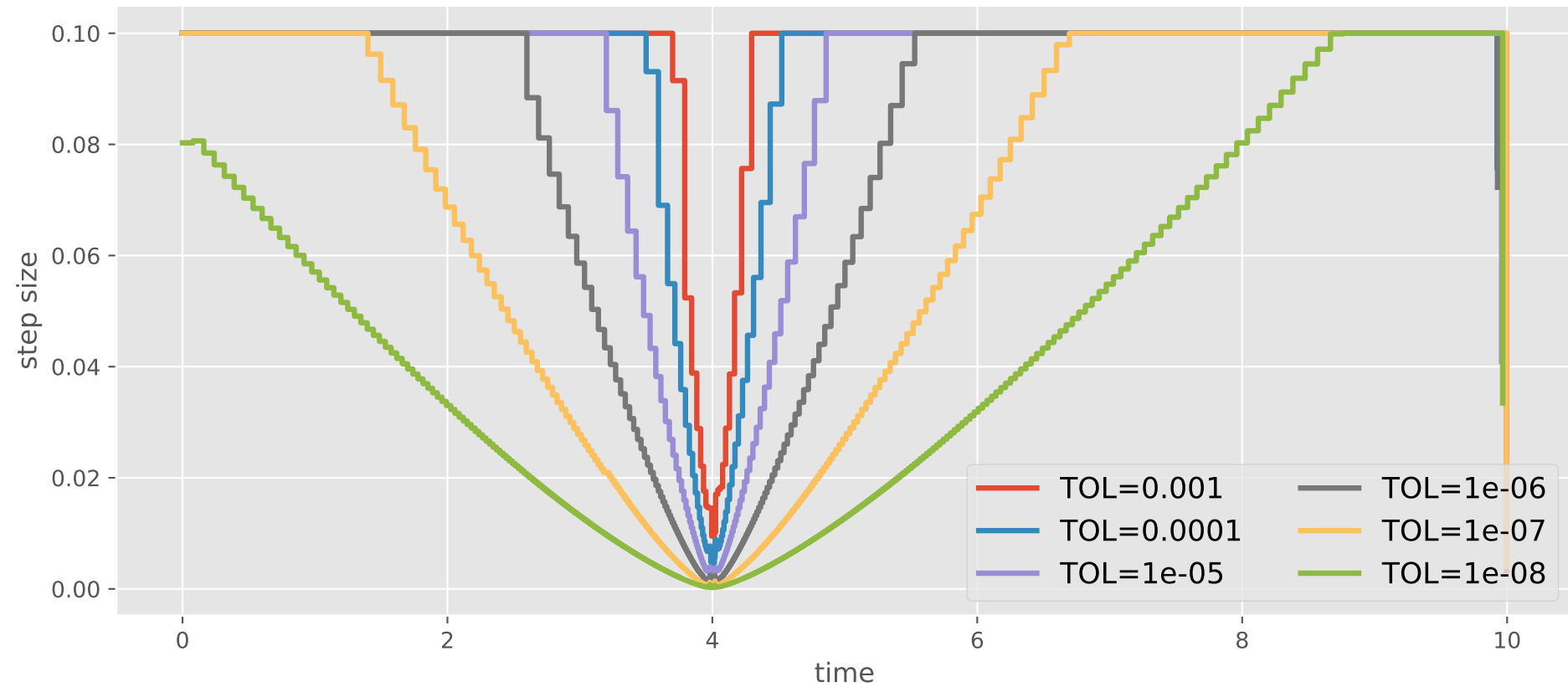
Adaptive discretization points (BS23)
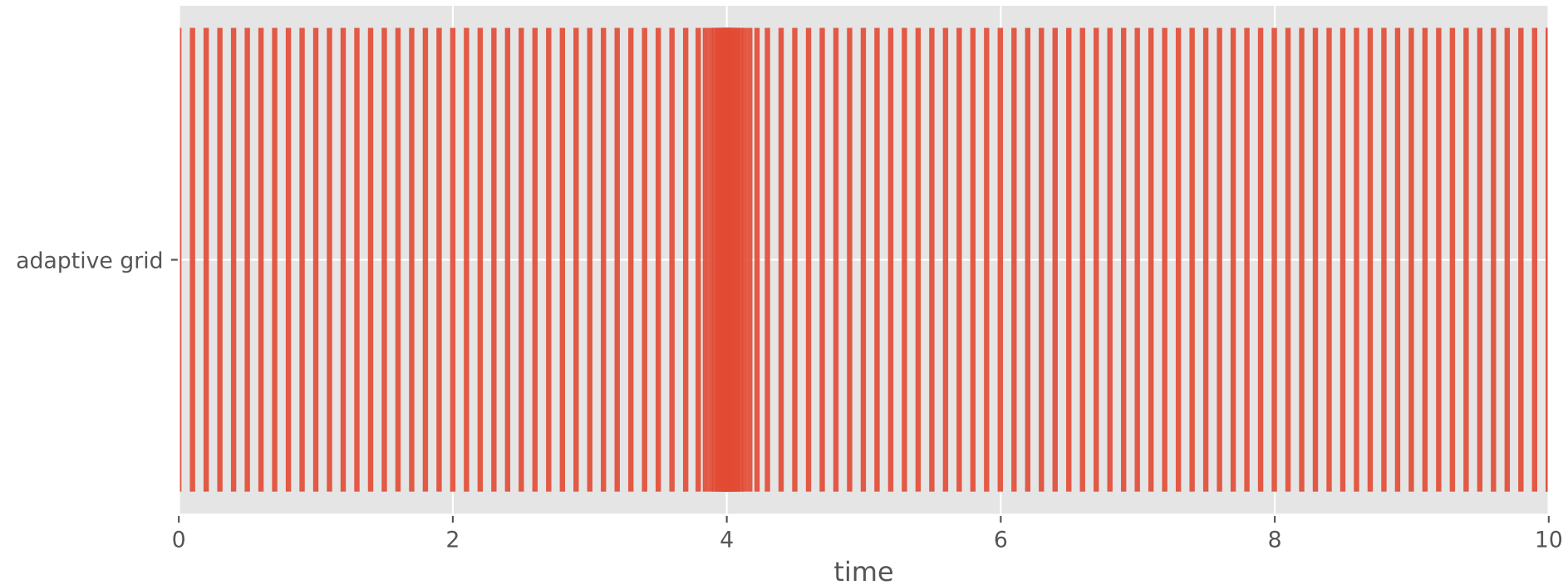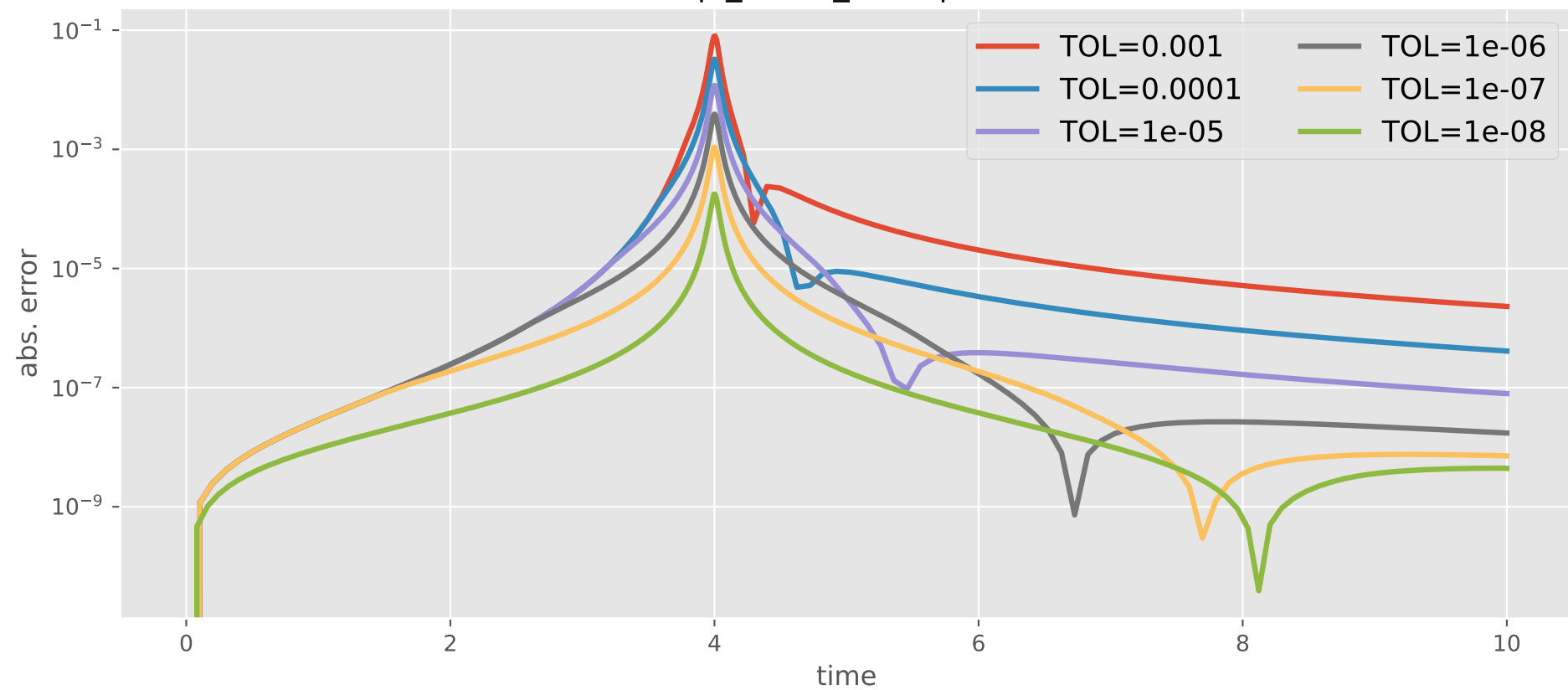
Adaptive stepsize
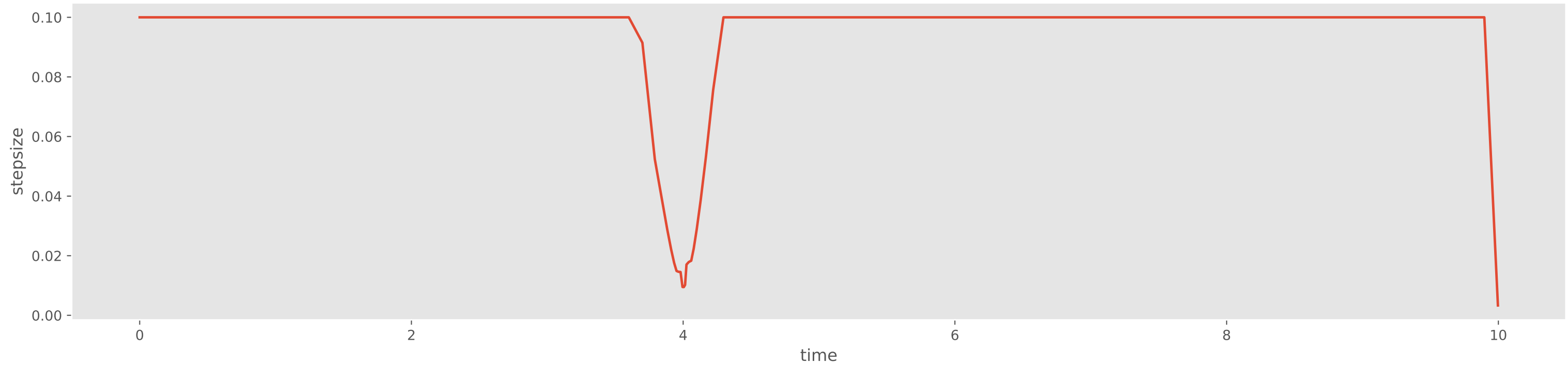
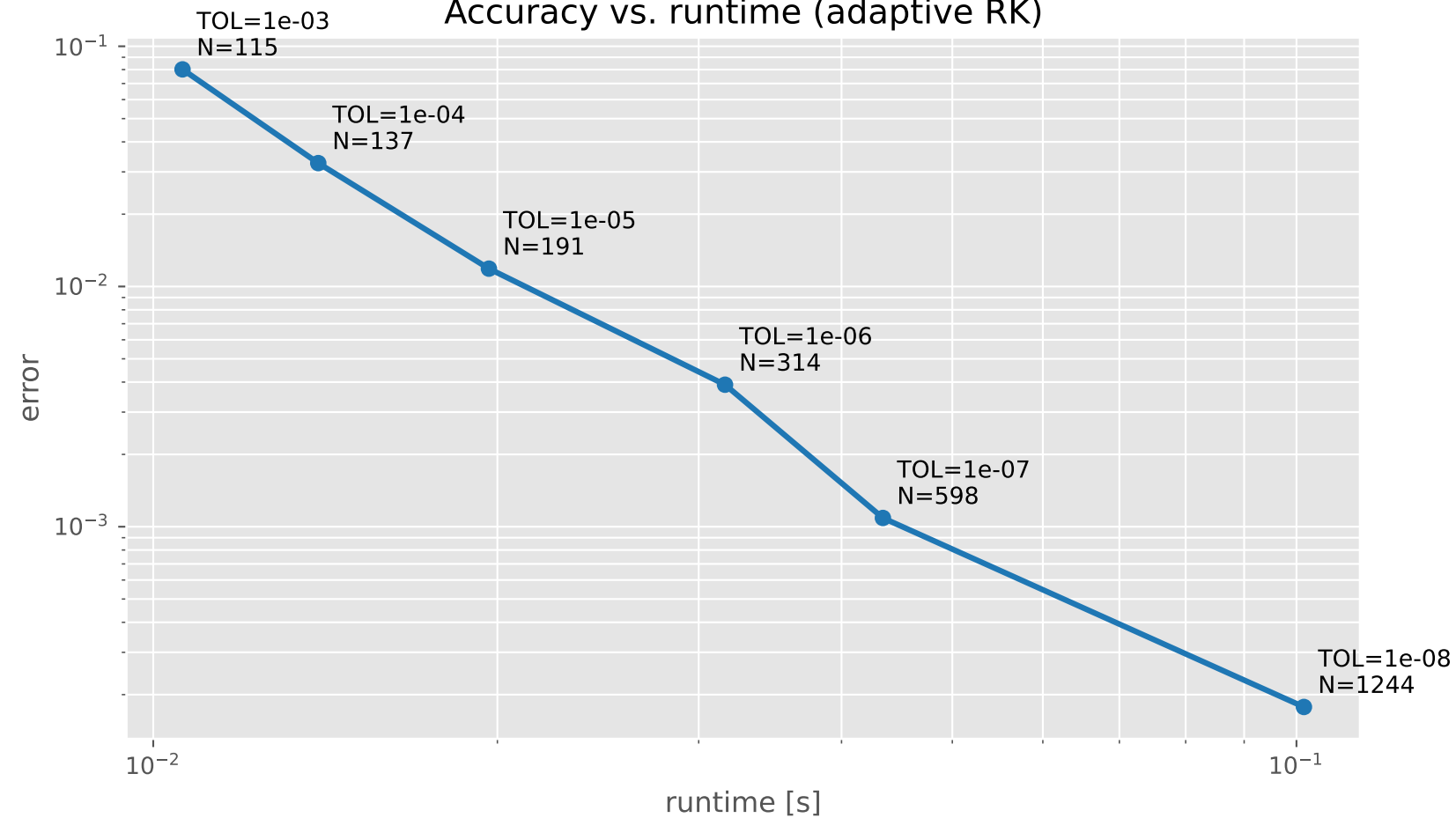Approximations for various TOL

Adaptive grids for different tolerances

Step sizes over time for different TOL
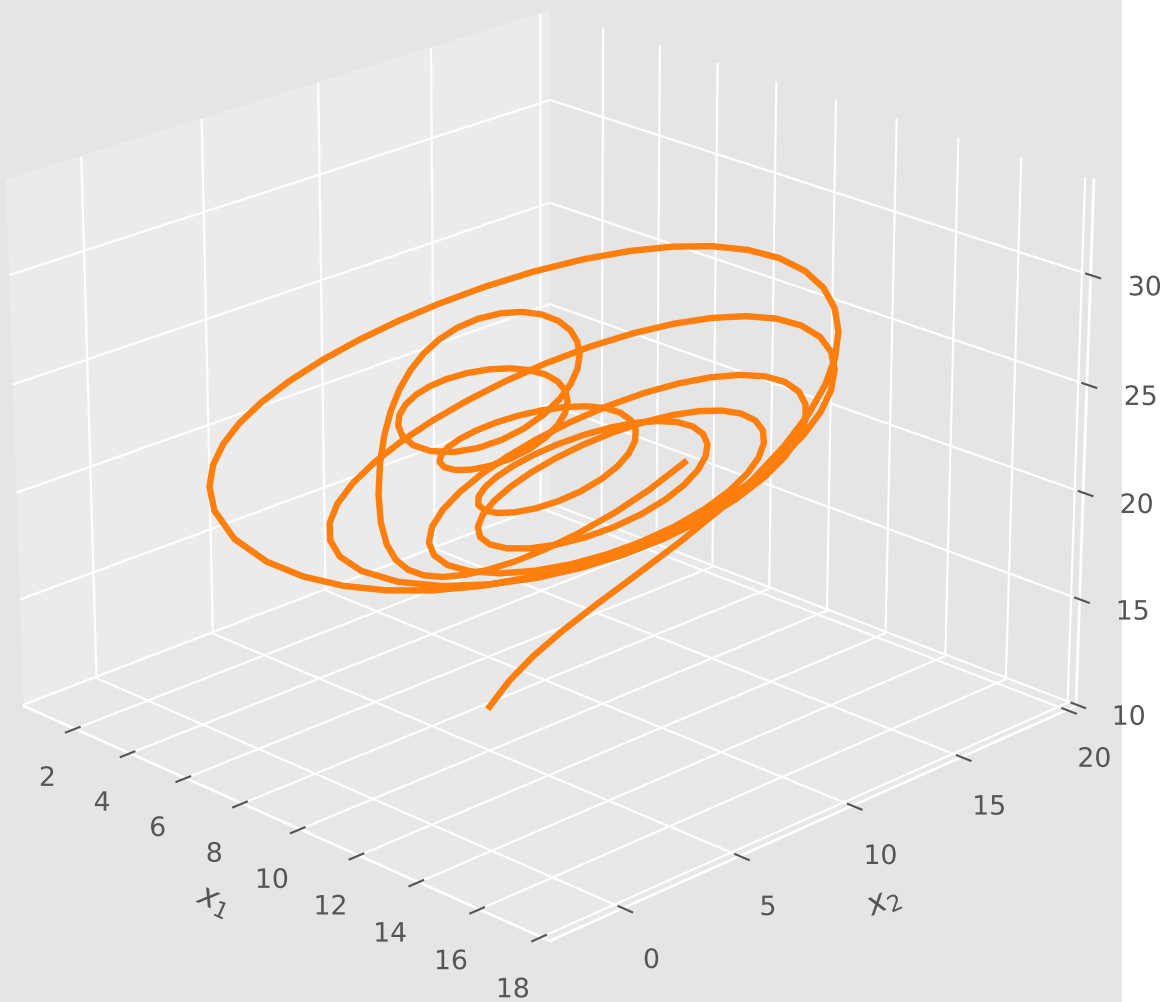
Grid error |x_ad - x_exact| for each TOL

Accuracy vs. runtime (adaptive RK)

TOL trade-off metrics (adaptive RK)

TOL	runtime [s]	×	N steps	×	max error	×	final error	×
1e-03	0.010607	×1.00	115	×1.00	8.015e-02	×1.0000	2.305e-06	×1.0000
1e-04	0.013943	×1.31	137	×1.19	3.264e-02	×0.4072	4.114e-07	×0.1785
1e-05	0.019662	×1.85	191	×1.66	1.187e-02	×0.1481	7.921e-08	×0.0344
1e-06	0.031634	×2.98	314	×2.73	3.901e-03	×0.0487	1.729e-08	×0.0075
1e-07	0.043477	×4.10	598	×5.20	1.088e-03	×0.0136	7.149e-09	×0.0031
1e-08	0.101513	×9.57	1244	×10.82	1.777e-04	×0.0022	4.398e-09	×0.0019

Forced Lorenz (adaptive BS23)

Adaptive step sizes (Lorenz)