Enright-Verner 10 stage combined order 6 and 7 Runge-Kutta scheme

See: The Relative Efficiency of Alternative Defect Control Schemes for High-Order Continuous Runge-Kutta Formulas
W. H. Enright SIAM Journal on Numerical Analysis, Vol. 30, No. 5. (Oct., 1993), pp. 1419-1445.

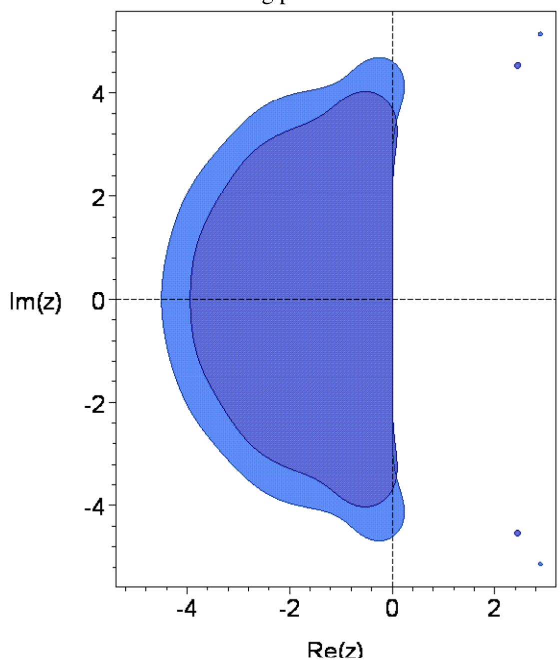
The nodes of the scheme are:

$$c_2=\frac{1}{18},\ c_3=\frac{1}{9},\ c_4=\frac{1}{6},\ c_5=\frac{4}{9},\ c_6=\frac{19}{39},\ c_7=\frac{7}{9},\ c_8=\frac{8}{9},\ c_9=1,\ c_{10}=1.$$

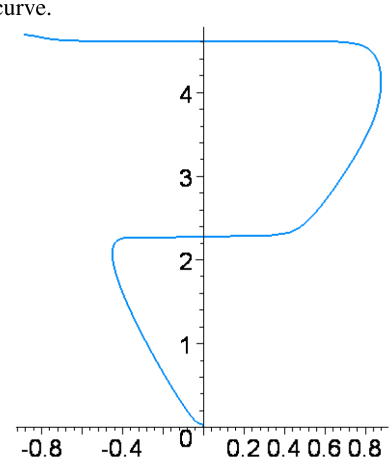
The principal error norm, that is, the 2-norm of the principal error terms is: $0.2834216102 \times 10^{(-4)}$.

The principal error norm of the order 6 embedded scheme is: $0.3895465771 \times 10^{(-3)}$.
The maximum magnitude of the linking coefficients is: 15.74002954.
The 2-norm of the linking coefficients is: 39.74195140.

The stability regions for the two schemes are shown in the following picture.



The stability region of the order 6 scheme appears in the darker shade.
The real stability intervals of the order 7 and 6 schemes are respectively $[-4.49987, 0]$ and $[-3.93715, 0]$.
The following picture shows the result of distorting the boundary curve of the stability region of the order 7 scheme horizontally by taking the 11th root of the real part of points along the curve.



The stability region intersects the nonnegative imaginary axis in the interval: $[2.2926, 4.6119]$.

The coefficients in exact form are:
c[2]=1/18,
c[3]=1/9,
c[4]=1/6,
c[5]=4/9,
c[6]=19/39,
c[7]=7/9,
c[8]=8/9,
c[9]=1,
c[10]=1,

a[2,1]=1/18,
a[3,1]=0,
a[3,2]=1/9,
a[4,1]=1/24,
a[4,2]=0,
a[4,3]=1/8,
a[5,1]=44/81,
a[5,2]=0,
a[5,3]=-56/27,
a[5,4]=160/81,
a[6,1]=91561/685464,
a[6,2]=0,
a[6,3]=-12008/28561,
a[6,4]=55100/85683,
a[6,5]=29925/228488,
a[7,1]=-1873585/1317384,
a[7,2]=0,
a[7,3]=15680/2889,
a[7,4]=-4003076/1083375,
a[7,5]=-43813/21400,
a[7,6]=5751746/2287125,
a[8,1]=50383360/12679821,
a[8,2]=0,
a[8,3]=-39440/2889,
a[8,4]=1258442432/131088375,
a[8,5]=222872/29425,
a[8,6]=-9203268152/1283077125,
a[8,7]=24440/43197,
a[9,1]=-22942833/6327608,
a[9,2]=0,
a[9,3]=71784/5947,
a[9,4]=-572980/77311,
a[9,5]=-444645/47576,
a[9,6]=846789710/90281407,
a[9,7]=-240750/707693,
a[9,8]=3972375/14534468,
a[10,1]=3379947/720328,
a[10,2]=0,
a[10,3]=-10656/677,
a[10,4]=78284/7447,
a[10,5]=71865/5416,
a[10,6]=-2803372/218671,
a[10,7]=963000/886193,
a[10,8]=0,
a[10,9]=0,

b[1]=28781/595840,
b[2]=0,
b[3]=0,
b[4]=820752/3128125,
b[5]=11259/280000,
b[6]=188245551/625100000,
b[7]=8667/43120,
b[8]=286011/2737280,
b[9]=5947/140000,
b[10]=0,

b*[1] = 577/10640,
b*[2]=0,
b*[3]=0,
b*[4]=8088/34375,
b*[5]=3807/10000,
b*[6]=-1113879/16150000,
b*[7]=8667/26180,
b*[8]=0,
b*[9]=0,
b*[10]=677/10000.

Version: 8 Oct 2011, Peter Stone