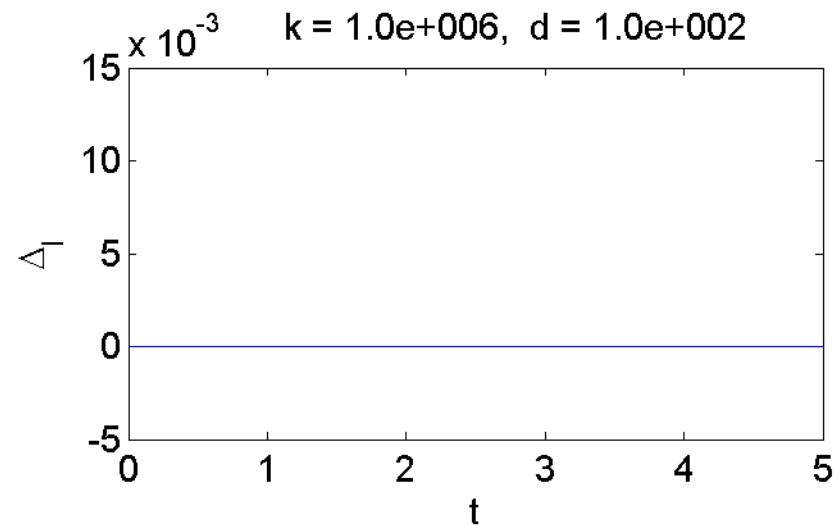
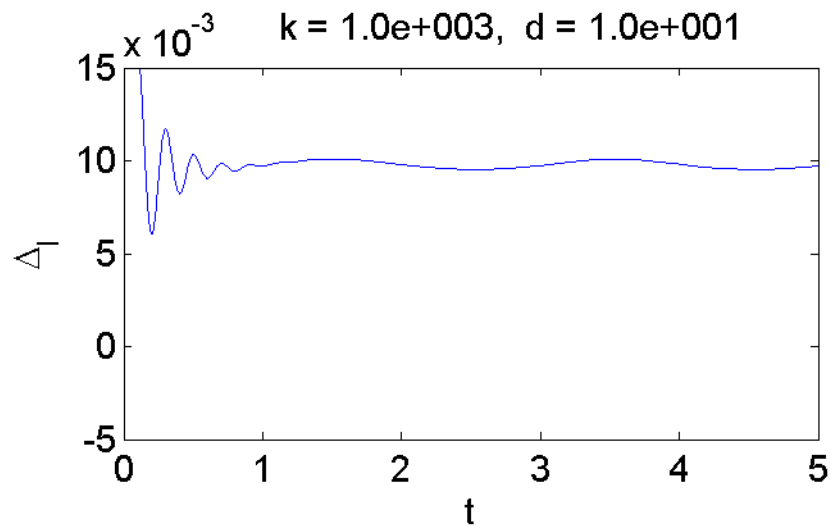
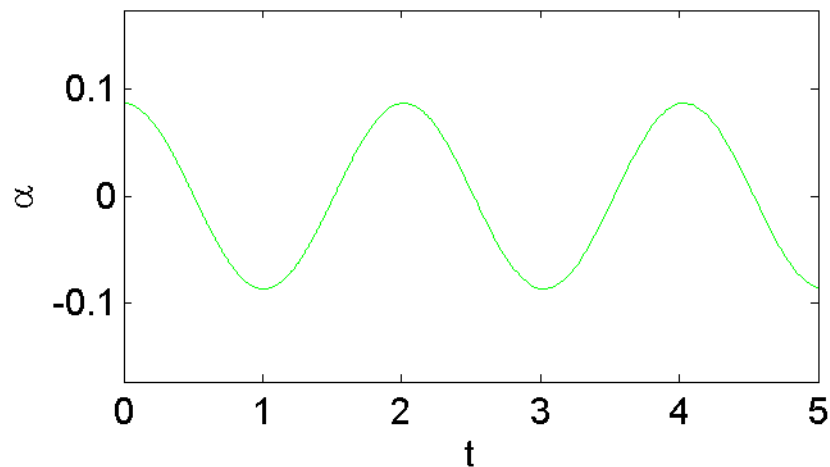


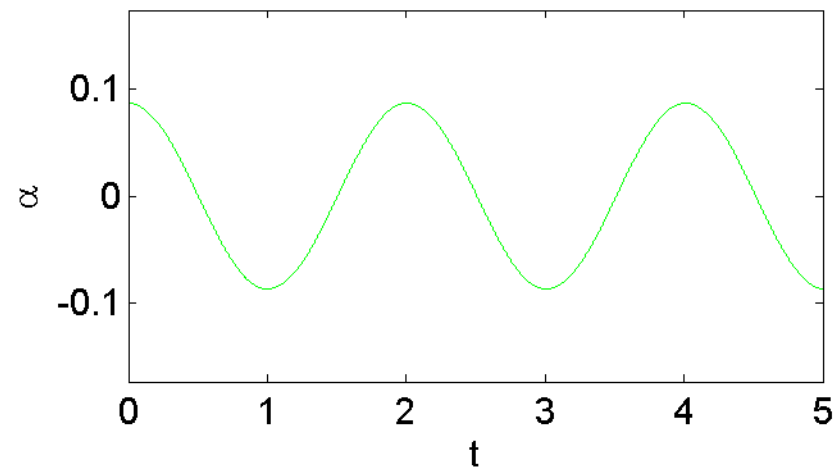
Steife Differentialgleichungen: Beispiel Pendel



Steifes Pendel $k = 1.0e+003, d = 1.0e+001$

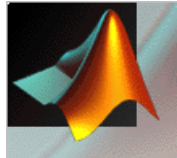


Steifes Pendel $k = 1.0e+006, d = 1.0e+002$



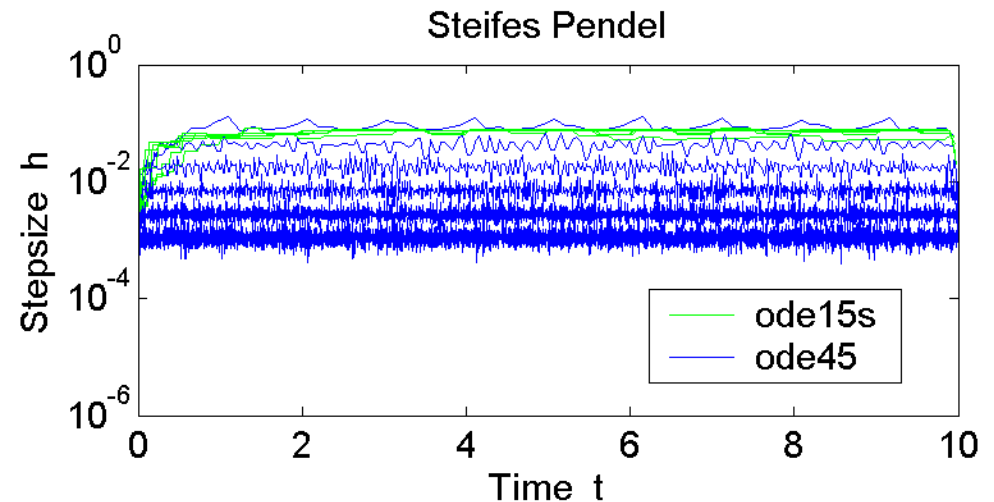
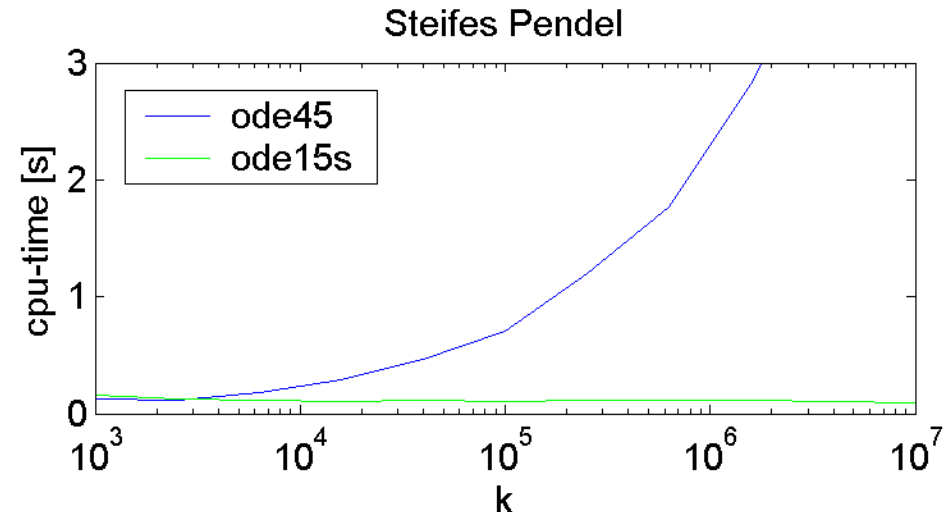
Steife Differentialgleichungen: Beispiel Pendel (II)

Beispiel: Steifes Pendel



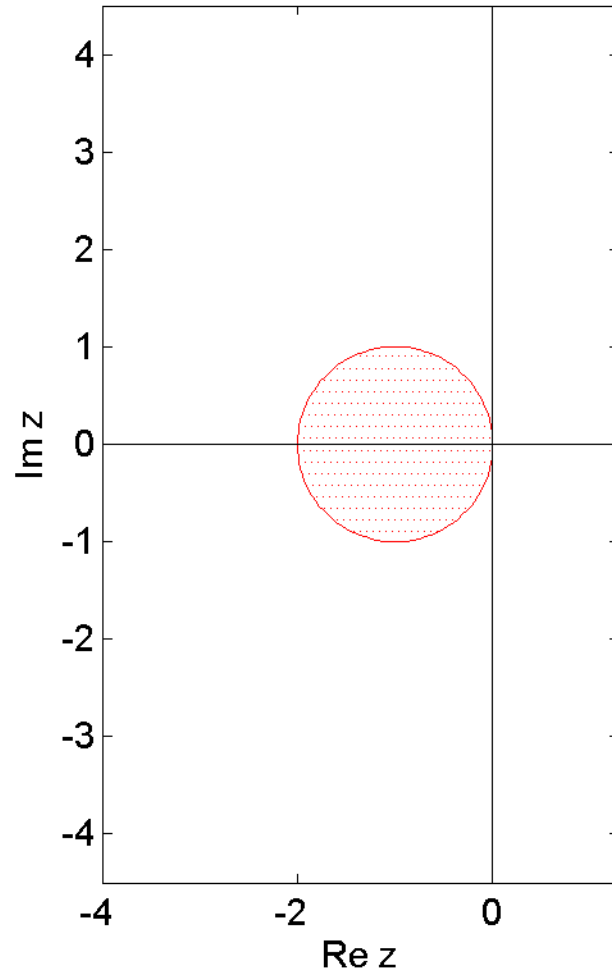
see [stiffpen.m](#)
[plotspen.m](#)
[solspen.m](#)

```
function yp = stiffpen ( t, y, d, k ),  
% -> allocate memory for output  
yp = zeros ( size(y) );  
% -> physical parameters  
g    = 9.81;  
len0 = 1.0;  
% -> read vector of unknowns  
alpha = y(1);  
alphap = y(2);  
dlen   = y(3);  
dlenp  = y(4);  
% -> evaluate right hand side  
yp(1) = alphap;  
yp(2) = - g/(len0+dlen) * sin(alpha);  
yp(3) = dlenp;  
yp(4) = (len0+dlen)*alphap + ...  
        g*cos(alpha) - d*dlenp - k*dlen;
```

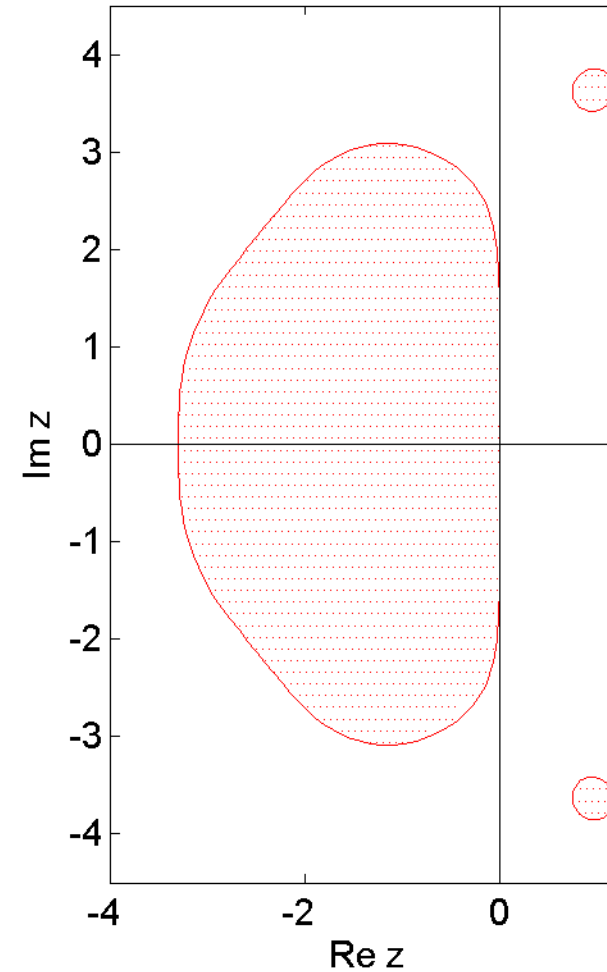


Stabilitätsgebiet: Explizite Runge-Kutta-Verfahren

Explizites Eulerverfahren

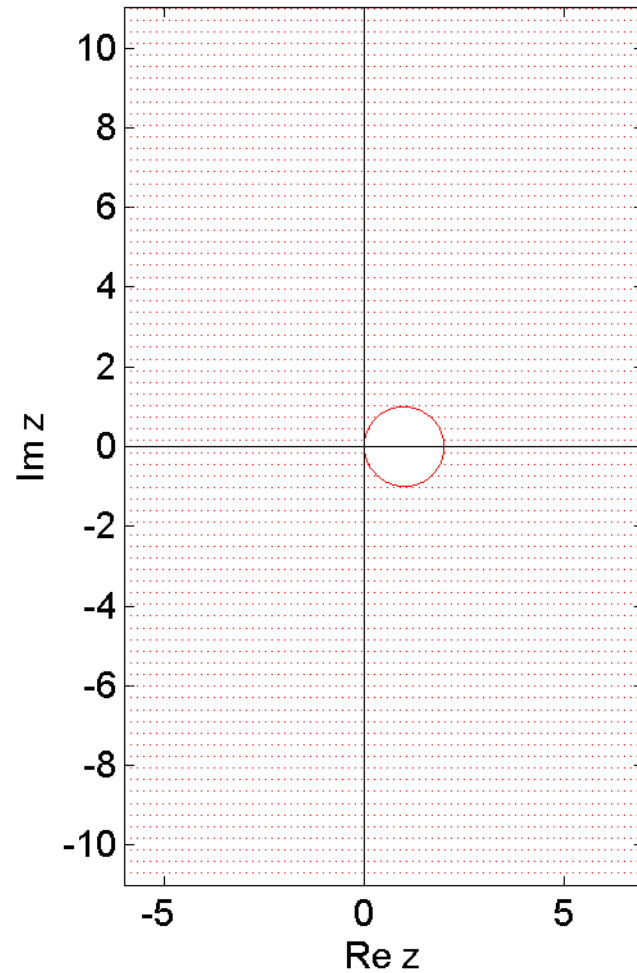


Verfahren 5. Ordnung von Dormand/Prince



Stabilitätsgebiet: BDF

Implizites Eulerverfahren



BDF mit $p = k = 4$

