

DERIVE NOTES - Prof. Richard B. Goldstein

Entering an expression	Ctrl + A
Simplify	(S)implify
Approximate	(S)implify (A)pproximate (A)pproximate
Substitute	(S)implify (S)ubstitute
Limits	(C)alculus (L)imit...
Differentiate	(C)alculus (D)ifferentiate...
Integrate	(C)alculus (I)ntegrate...
Summation	(C)alculus (S)um...
Taylor Series	(C)alculus (T)aylor series...
Loading Utilities	(F)ile (L)oad (U)tilities
Differential Applications	dif_apps.mth
Tangent line	tangent(y,x,x0)
Curvature	curvature(y,x)
Implicit differentiation	imp_dif(u,x,y,n)
Curvature in 3-D	curvature3d(r,t) user defined *
Integral Applications	int_apps.mth
Arc length	arc_length(f(x),x,a,b)
Area of revolution	area_of_revolution(f(x),x,a,b)
ODE Approximation	ode_appr.mth
Direction fields	direction_field(r,x,x0,xm,m,y,y0,yn,yn,n)
Taylor Series	taylor_ode1(r,x,y,x0,y0,n)a
Euler	euler(r,x,y,x0,y0,h,n)
Runge-Kutta	rk([r],[x,y],[x0,y0],h,n)

* $r := [2t^3, -3t^2, 6t]$
 $curvature3d(r,t) := \frac{\text{abs}(\text{cross}(\text{dif}(r,t,1), \text{dif}(r,t,2)))}{(\text{abs}(\text{dif}(r,t,1)))^3}$

results in:
$$\frac{\sqrt{t^4 + 4t^2 + 1}}{6(t^4 + t^2 + 1)^{1.5}}$$