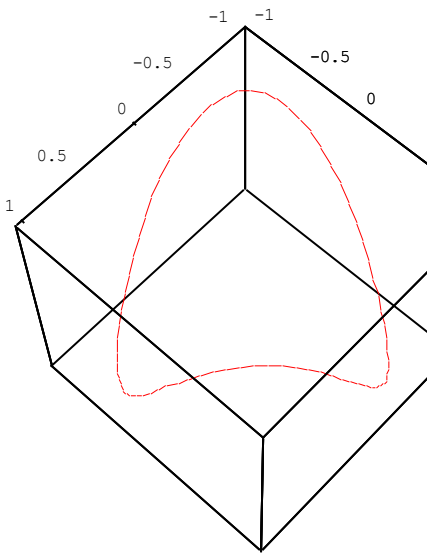
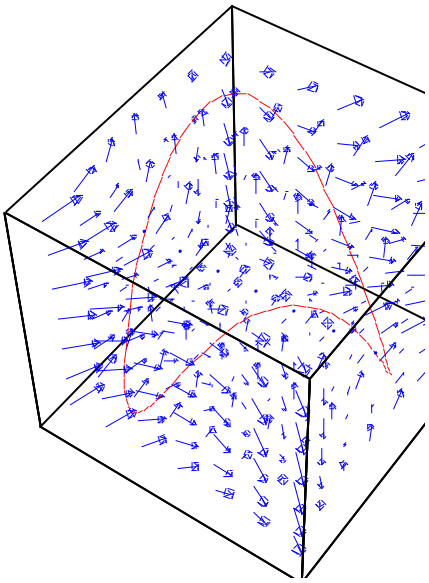
16.8 STOKES' THEOREM

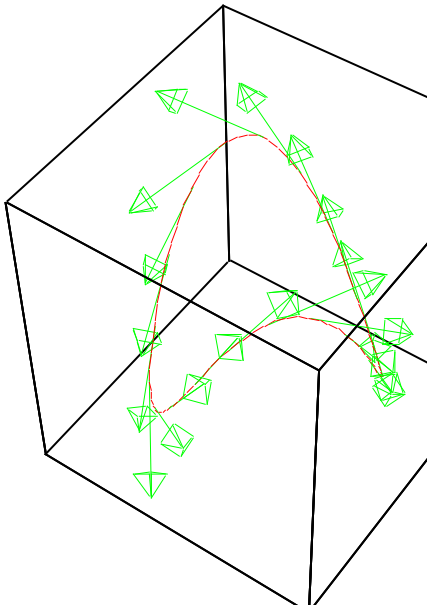
Given: Closed curve C: r(s) and Vector Field F

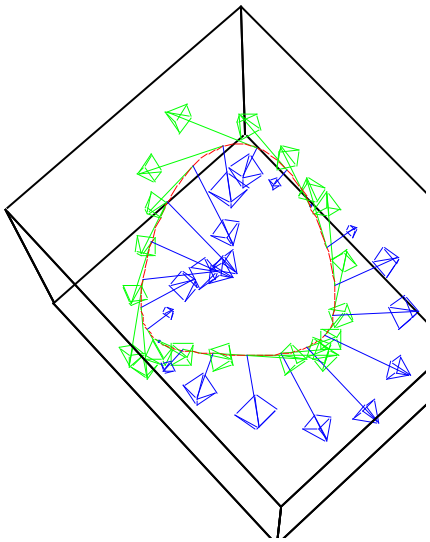




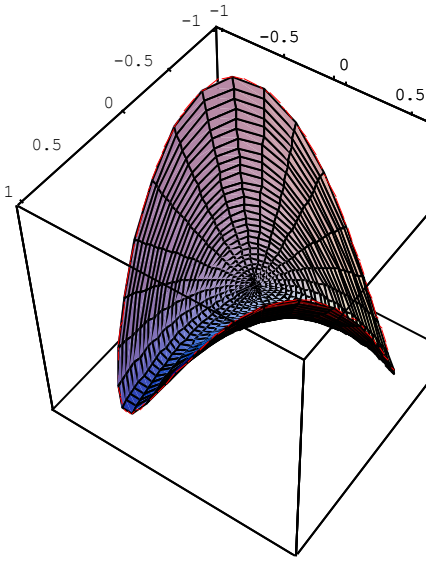
Draw unit tangent vectors T(s) to C

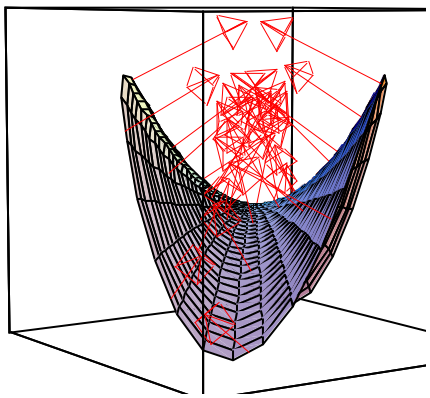
Find the work done by F along C: $\oint_C F \cdot T ds$





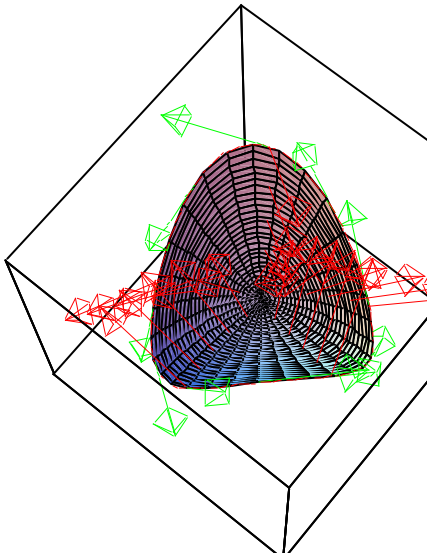
Consider a surface σ whose boundary is C Draw unit normal vectors to σ : n



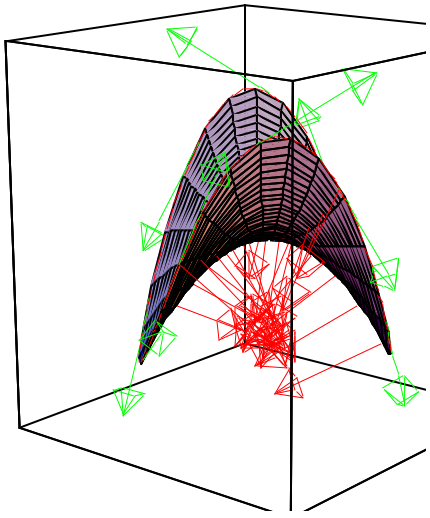


GREEN AND RED ARROWS MUST MATCH

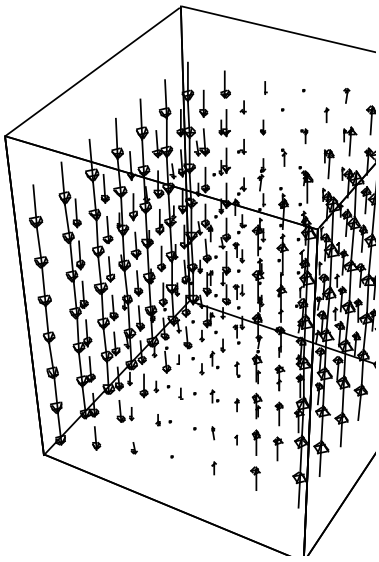
MATCH



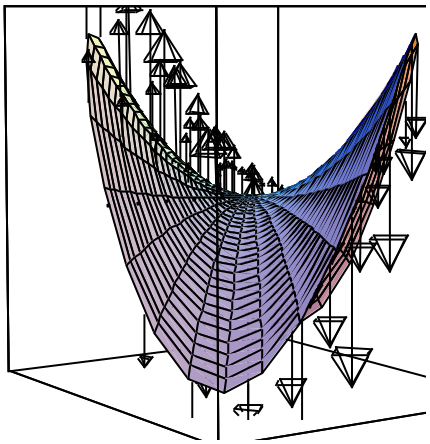
NO MATCH



Find Curl(F)



Curl(F) on σ



STOKES' THEOREM

Work done by F along C equals to the Flux of Curl(F) through σ.

$$\oint_C F \cdot T ds = \iint_\sigma Curl\, F \cdot n\, dS$$