

## Assignment 11

Coverage: 16.5(part), 16.6, 16.7(part) in Text. The topics on moments and center of mass for curve and surfaces, and implicit surfaces will not be included in the final examination.

Exercises: 16.5 no 17, 19, 42, 46, 48, 16.6 no 4, 7, 10, 15, 20, 25, 40. 16.7 no 3, 6, 8, 13.

Hand in 16.5 no 42; 16.6 no 25, 16.7 no 3, 13 by November 30.

### Supplementary Problems

1. (optional) An open region  $G$  is called simply-connected if for every closed curve  $C$  sitting inside  $G$ , there is a deformation to deform  $C$  to a point where the whole process happens inside  $G$ . Specifically, there is a smooth map  $\Phi(t, s)$  from  $[a, b] \times [0, 1]$  to  $G$  such that  $\Phi(t, 0), t \in [a, b]$ , is a parametrization of  $C$  and  $\Phi(t, 1)$  maps to a single point. Show that whenever a vector field  $\mathbf{F}$  fulfills the component test in  $G$ , it is conservative.