

$$D = (f_{xx})(f_{yy}) - (f_{xy})^2$$

$$A(S) = \iint_D \sqrt{1 + \left(\frac{\partial z}{\partial x}\right)^2 + \left(\frac{\partial z}{\partial y}\right)^2} dA$$

$$z = \rho \cos \phi, x = \rho \sin \phi \cos \theta, y = \rho \sin \phi \sin \theta, dV = \rho^2 \sin \phi d\rho d\theta d\phi.$$