

EE702: Lec-7 (31 Jan)

$f_{ij}^{(n+1)} = \text{update } p_{ij}^{(n)}, z_{ij}^{(n)}$
 $E(x,y) = R(p,e)$
 Smoothness constraint
 \downarrow recover $(p,e)/(f,g)$
 use Occl bound as IC
 $z(x,y) = z_A(x,y_0) + \int_A^B p dx + \int_A^B q dy$

$$\min_z \iint_A [(z_x - p)^2 + (z_y - q)^2] dx dy$$

Soln: $\frac{\delta F}{\delta z} - \frac{\partial}{\partial x} \frac{\delta F}{\delta z_x} - \frac{\partial}{\partial y} \frac{\delta F}{\delta z_y} = 0$

$2(z_{xx} - p_x)$ $2(z_{yy} - q_y) = 0$

$$\Rightarrow \boxed{\nabla^2 z = p_x + q_y}$$

computed Laplacian

NOTE: $\oint_C p dx + q dy = 0 \forall C$ Green's Theorem $\rightarrow \iint_{R(C)} (q_x - p_y) dx dy = 0 \forall R(C)$

$$\boxed{z_{yx} = z_{xy}} \iff \boxed{q_x = p_y}$$

"Integrability Constraint"

$$\iint_{R(C)} \underbrace{\left[\lambda_2 (q_x - p_y) + \lambda_1 (p_x^2 + p_y^2 + q_x^2 + q_y^2) + (E - R)^2 \right]}_F dx dy$$