1 Introduction

$f(\phi(u,v)) = g(u,v)$

$$\phi(x,0) = (x,0) \tag{1}$$

$\phi = (\phi_1, \phi_2)$
implies the folowing:
$y\, divides\, \phi_2(x,y)$
ie
$\phi_2(x,y) = y.k(x,y)$
and:
$\phi_1(x,y) = x + y.q(x,y)$
for some polynomials q, k.

2 Gk conditions

the Gk are all the partial derivative of order less than k of $f(phi)$ and g are equale.

3 G1 Equation

Because of the 1 the jacobian of ϕ is of the forme:

$$D\phi = \begin{pmatrix} 1 & a(u,v) \\ 0 & b(u,v) \end{pmatrix}$$

a and b are functions of u,v.

and the G1 condition: $\partial_v g = a(u,v)\,\partial_u f(\phi) + b(u,v)\,\partial_v f(\phi)$ with $v = 0$. can also be written:

$$\partial_v g = (\partial_u f(\phi), \partial_v f(\phi)) \begin{pmatrix} a \\ b \end{pmatrix}$$

4 G2 condition

$$\partial_v^2 g = (a,b)(DDf)(\phi) \begin{pmatrix} a \\ b \end{pmatrix} + Df(\phi)\partial_v \begin{pmatrix} a \\ b \end{pmatrix}$$

DDf is the hessian of f.