T_p
(x, U)
p
$x_i p$
$i =$
$1, \dots, m$
$_i\big|_p(f) :=$
$\partial_i (f \circ$
$x^{-1})\big|_{x(p)}$
∂_i
i
$(x_1\big|_p, \dots, x_m\big|_p)$
p
$\sum_{i=1}^m v(x_i) x_i\big|_p =$
$\sum_{i=1}^m \xi x_i\big|_p.$
??
$_1\big|_p(x^j) =$
δ_{ij}
$(x_1\big|_p, \dots, x_m\big|_p)$
p
$f :$
$U \subset\to$
$U' \subset$
U
p
$p \in$
U'
$f_i :$
U'
$\sum_{i=1}^m \to$
$(x_i -$
$x_i(p)) f_i.$
$f_i(p) =$
$x_i\big|_p(f)$
$_t angential vectors.pdf$
$\psi(U) -$
$\psi(U_0) =$
$\int_0^1 t\psi(tU +$
$(1 -$
$t)U_0)t$
$U =$
$x(q)$
$q \in$
$U_0 =$
$x(p)$
$\psi(U) -$
$\psi(U_0) =$
$\sum_i (U^i -$
$U_0^i) \int_0^1 \underbrace{\psi U'(tU + (1-t)U_0)t}_{:=\psi_i(U)}$
$f_i =$
$\psi_i \circ$
$x :$
$U \subset\to$
f_i
$\psi(U) -$
$\psi(U_0) =$
$\psi(x(q)) -$
$\psi(x(p)) =$
$f(q) -$
$f(p)$
$U^i =$
$x^i(q)$
$U_0^i =$
$x^i(p)$
$\psi_i(U) =$
$\psi_i(x(1)) =$
$f_i(q)$
$\sum_{i=1}^n (x_i(q) -$
$x_i(p)) f_i(q)$
$_i\big|_p(f) =$
$\partial_i \underbrace{(f \circ x^{-1})}_{\psi} \big|_{x(p)}$
$=$
$\partial_i \psi\big|_{x(p)}$
$=$
$\psi_i(x(p)) =$
$f_i(p)$
$\psi(U) =$