

## COORDENADAS $X_{UTM}$ $Y_{UTM}$ $H$

### SOLUCIÓN

#### CALCULO ALTIMETRÍA

$E$	$V$	$t$	$i-m$	$C_{(e-r)}$	$\Delta H$	$\Delta H$ media	Altitud	Comp. pp $\Delta H$	$\Delta H$ comp	Altitud comp
4	10	40,142	0,330	0,460	40,932					
10	4	-41,531	0,230	0,460	-40,841	40,887	$H_{10} = 664,455$	60	40,947	$H_{10} = 664,515$
	15	0,033	0,230	0,366	0,629					
15	10	-1,125	0,330	0,366	-0,429	0,529	$H_{15} = 664,984$	1	0,530	$H_{15} = 665,045$
	17	33,020	0,250	0,302	33,572					
17	15	-34,180	0,310	0,302	-33,568	33,570	$H_{17} = 698,554$	49	3,619	$H_{17} = 698,664$
	20	-8,729	0,310	0,240	-8,178					
20	17	7,655	0,250	0,240	8,145	-8,162	$H_{20} = 690,392$	12	-8,150	$H_{20} = 690,514$
						$\Sigma \Delta H = 83,148$	$e_c = -0,122$	$\Sigma c = +0,122$		

#### CALCULO DE ORIENTACIONES UTM

$E$	$V$	Lectura	Azimet	Desorient. diferencias	Desor.med.	Azimet	Desorienta.	Correccion	Azim. Corr.
4	6	65,6510	238,6775	173,0265	173,0225				
	3	108,0386	281,0616	173,0230	0,0011				
	8	85,8954	258,9173	173,0219					
	10	0,0019				173,0244		0	173,0244
10	4	83,2416				373,0244	289,7828		
	15	368,4393				258,2221		0	258,2221
15	10	231,8951				58,2221	226,3270		
	17	55,2740				281,6010		0	281,6010
17	15	315,7206				81,6010	165,8804		
	20	42,0762				207,9566		1 <sup>cc</sup>	207,9567
20	17	249,3239				7,9566	158,6327		
	21	333,0243	91,6565	158,6322	-0,0014	158,6329		2 <sup>cc</sup>	
	19	119,4666	278,1002	158,6336					

Tolerancia desorientaciones = 21<sup>cc</sup>

Tolerancia cierre = 47<sup>cc</sup>

Error cierre = -2<sup>cc</sup>

## CALCULO DE DISTANCIAS UTM

	<i>dist geom</i>	<i>DH</i>	$Dg^2 - DH^2$	<i>denominador</i>	$D_{UTM}$	$D_{UTM Med}$
4-10	2641,72501	40,947	6977034,35	1,000202221	2640,21093	2640,20274
10-4	2641,70863	-40,947	6976947,81	1,000202221	2640,19456	
10-15	2356,33901	0,53	5552333,24	1,000208733	2355,26372	2355,25131
15-10	2356,31418	-0,53	5552216,24	1,000208733	2355,2389	
15-17	2141,82216	33,619	4586271,93	1,000214094	2140,57534	2140,57074
17-15	2141,81297	-33,619	4586232,56	1,000214094	2140,56615	
17-20	1909,59644	-8,15	3646492,15	1,000218093	1908,69875	1908,68604
20-17	1909,57101	8,15	3646395,04	1,000218093	1908,67334	

	<i>h</i>	<i>k</i>
4	623,568	0,999648
10	664,515	
15	665,045	
17	698,664	
20	690,514	

## CALCULO DE COORDENADAS UTM

	$D_{UTM Med}$	<i>Azim. Corr.</i>	<i>Azim rad.</i>	$Cos Q$	$Sen Q$
4 10	2640,20274	173,0244	2,71786092	-0,91156093	0,41116501
10 15	2355,25131	258,2221	4,05614326	-0,61014668	-0,79228847
15 17	2140,57074	281,6010	4,42337816	-0,28500421	-0,95852627
17 20	1908,68604 9044,71084	207,9567	3,2665762	-0,99219972	-0,12465841

	<i>DX</i>	<i>DY</i>	<i>X Calc</i>	<i>Y Calc</i>	
	1085,55899	-2406,705675	438690,992	4465852,094	
	-1866,03846	-1437,04878	436824,954	4464415,046	
	-2051,79328	-610,0716647	434773,160	4463804,974	
	-237,933773	-1893,797755	434535,226	4461911,176	
UTM	<b>X</b>	<b>Y</b>	Ex m	-0,075	
<b>4</b>	437605,433	4468258,800	Ey m	0,052	Etotal mm 96,0208311
<b>20</b>	434535,301	4461911,124			

COMPENSACIÓN PROPORCIONAL A LAS DISTANCIAS

<i>Comp.</i>	<i>DX Comp</i>	<i>DY Comp</i>	<i>X Comp</i>	<i>Y Comp</i>
X	Y			
0,02189293	-0,015179097	1085,581	-2406,721	438691,014 4465852,079
0,01953007	-0,013540849	-1866,019	-1437,062	436824,995 4464415,017
0,01774991	-0,012306604	-2051,776	-610,084	434773,219 4463804,933
0,01582709	-0,010973449	-237,918	-1893,809	434535,301 4461911,124

$E_{L \text{ mm}}$  33,9411255

$E_{T \text{ mm}}$  412,6874877

Precision coordenadas 16,0034667 mm

<i>Vértice</i>	Resumen Coordenadas	
<b>4</b>	437605,433	4468258,800
<b>10</b>	438691,014	4465852,079
<b>15</b>	436824,995	4464415,017
<b>17</b>	434773,219	4463804,933
<b>20</b>	434535,301	4461911,124