รายการอ้างอิง

1. ITU-R Rec.PN 839,Geneva,1992,"Rain height model for prediction methods"
2. ธวัชชัย พฤกษะวัน. ฝน. เอกสารวิชาการ กรมอุตุนิยมวิทยา (2534) : 1 - 6.
3. Recommendation and Reports of the CCIR XVIth Plenary Assembly,Dubrovnik 1986,Volume V (Propagation in nonionized media);Report 563-3."Radiometeological data"
4. G.O Ajayi and f.barbaliscia,"Prediction of Attenuation due to rain: characteristics of the 0°C Isotherm Height in Temperate and Tropical climates," Int Jour.of Satellite Communication vol-8, pp. 187-196 ,1990
5. H. Trommer, S. Szuppa, G. Heyer,"Variations of 0°C Isotherm Height during Rain in the Berlin Area," U.R.S.I. CLIMPARA'94 Commission F Symposium Moscow , 31 May - 3June 1994 : pp 5.6.1 - 5.6.4
6. Leitao M J M and Watson P A ,"Prediction of Attenuation on Satellite-Earth Links in the European Region," IFF Proceedings, vol 134,No 6,October 1987: pp 583-596
7. M.S. Pontes, L.A.R. Silva Mello, R.S.L. Souza,"Radiometric Measurements of Effective Rain Height," U.R.S.I. CLIMPARA'94 Commission F Symposium Moscow , 31 May - 3June 1994 : pp 5.7.1-5.7.4
8. B Kochtubajda, D.V. Rogers,"Freezing Level Characteristics at Selected Stations across Canada," U.R.S.I. CLIMPARA'94 Commission F Symposium Moscow , 31 May - 3June 1994 : pp 12.4.1 - 12.4.6
9. Recommendation and Reports ITU-R PN618-2,15 March 1994,"Propagation Data and Prediction Methods Required for the Design of Earth-Space Telecommunications Systems"
10. บำรุง สรัคคานนท์ 2529, อุตุนิยมวิทยาทั่วไป กรมอุตุนิยมวิทยา 217 หน้า
11. กรมอุตุนิยมวิทยา 2521,นิยามศัพท์อุตุนิยมวิทยา กรมอุตุนิยมวิทยา 219 หน้า
12. สุกิจ เย็นทรวง 2534,พายุฟ้าคะนอง กรมอุตุนิยมวิทยา 30 หน้า
13. จงกลนี อยู่สบาย 2536,พายุฟ้าคะนองในประเทศไทย
14. Riehl H,Tropical Meteorology. New York: McGraw-hill Publishing Company Ltd.,1954
15. A.F. Siegel,Statistics and Data Analysis. New York: John Wiley & Sons,Inc,1988
16. Recommendation and Reports ITU-R PN618-2,Geneva,1992,"Propagation Data and Prediction Methods Required for the Design of Earth-Space Telecommunications Systems"

17. Arnold Kawecki,"Long Term 0°C Isotherm Heights Characteristics in Warsaw Region," U.R.S.I. CLIMPARA'94 Commission F Symposium Moscow , 31 May - 3June 1994 : pp 12.4.1 - 12.4.6

18. Rachan Lekkla, S.L. Lim, J. Wachja, K.S. McKormick,"Rain Attenuation Measurement in South East Asia,"U.R.S.I. CLIMPARA'94 Commission F Symposium Moscow , 31 May - 3June 1994 pp 12.4.1 - 12.4.6

19. Robert A. Houze,Jr.,"Convective and Stratiform Precipitation in the Tropics," Tropical Rainfall Measurements. A DEEPAK Publishing ,1988

20. Recommendation and Reports ITU-R PN837,Geneva,1992,"Characteristics of Precipitation for Propagation Modelling"

21. Recommendation and Reports ITU-R PN838,Geneva,1992,"Specific Attenuation Model for Rain for Use in Prediction"

ภาคผนวก

ข้อมูลที่ใช้ในการวิเคราะห์ความถดถอยที่อุบลราชธานี

X	Y	Xi - X	Yi - Y	(Xi-X)(Yi-Y)	(Xi-X)	(Yi-Y)
0.2	4180	-5.6343284	-754.68254	4252.129235	31.745656	569545.736
0.2	4490	-5.6343284	-444.68254	2505.487444	31.745656	197742.561
0.2	4560	-5.6343284	-374.68254	2111.084459	31.745656	140387.006
0.2	4676	-5.6343284	-258.68254	1457.502369	31.745656	66916.6563
0.2	4733	-5.6343284	-201.68254	1136.345653	31.745656	40675.8468
0.2	4720	-5.6343284	-214.68254	1209.591921	31.745656	46088.5928
0.2	4720	-5.6343284	-214.68254	1209.591921	31.745656	46088.5928
0.2	4980	-5.6343284	45.3174603	-255.333452	31.745656	2053.67221
0.2	4980	-5.6343284	45.3174603	-255.333452	31.745656	2053.67221
0.2	5029	-5.6343284	94.3174603	-531.415541	31.745656	8895.78332
0.2	5140	-5.6343284	205.31746	-1156.82599	31.745656	42155.2595
0.2	5188	-5.6343284	253.31746	-1427.27375	31.745656	64169.7357
0.4	4510	-5.4343284	-424.68254	2307.864369	29.5319247	180355.26
0.4	4718	-5.4343284	-216.68254	1177.52407	29.5319247	46951.323
0.4	4890	-5.4343284	-44.68254	242.8195925	29.5319247	1996.52935
0.4	4820	-5.4343284	-114.68254	623.2225776	29.5319247	13152.0849
0.4	4999	-5.4343284	64.3174603	-349.522199	29.5319247	4136.7357
0.4	4950	-5.4343284	15.3174603	-83.240109	29.5319247	234.624591
0.4	4960	-5.4343284	25.3174603	-137.583393	29.5319247	640.973797
0.4	5030	-5.4343284	95.3174603	-517.986378	29.5319247	9085.41824
0.4	5298	-5.4343284	363.31746	-1974.38638	29.5319247	131999.577
0.4	5521	-5.4343284	586.31746	-3186.2416	29.5319247	343768.164
0.6	4490	-5.2343284	-444.68254	2327.614428	27.3981934	197742.561
0.6	4936	-5.2343284	1.31746032	-6.8960199	27.3981934	1.73570169
0.6	5210	-5.2343284	275.31746	-1441.10199	27.3981934	75799.704
0.6	5263	-5.2343284	328.31746	-1718.52139	27.3981934	107792.355
0.6	5398	-5.2343284	463.31746	-2425.15572	27.3981934	214663.069
0.6	5783	-5.2343284	848.31746	-4440.37214	27.3981934	719642.513
0.8	4900	-5.0343284	-34.68254	174.6032931	25.344462	1202.87856
0.8	4983	-5.0343284	48.3174603	-243.245961	25.344462	2334.57697

X	Y	Xi - X	Yi - Y	(Xi-X)(Yi-Y)	(Xi-X)	(Yi-Y)
1	4450	-4 8343284	-484 68254	2343.114546	23.3707307	234917.164
1	4560	-4.8343284	-374.68254	1811.338427	23.3707307	140387.006
1	4550	-4.8343284	-384.68254	1859 68171	23.3707307	147980.656
1	4560	-4 8343284	-374.68254	1811.338427	23 3707307	140387.006
1	4510	-4.8343284	-424.68254	2053.054845	23.3707307	180355.26
1	4610	-4.8343284	-324.68254	1569.622009	23.3707307	105418.752
1	4640	-4.8343284	-294.68254	1424.592158	23.3707307	86837.7992
1	4600	-4.8343284	-334.68254	1617.965293	23.3707307	112012.402
1	4820	-4.8343284	-114.68254	554.4130538	23.3707307	13152.0849
1	4850	-4.8343284	-84 68254	409.383203	23.3707307	7171.13253
1	5040	-4.8343284	105.31746	-509.139185	23.3707307	11091.7674
1	5030	-4 8343284	95 3174603	-460.795901	23.3707307	9085.41824
1	5086	-4 8343284	151.31746	-731.51829	23.3707307	22896.9738
1	5125	-4.8343284	190.31746	-920.057095	23 3707307	36220.7357
1	5242	-4.8343284	307.31746	-1485.67351	23.3707307	94444.0214
1	5372	-4.8343284	437.31746	-2114.1362	23.3707307	191246.561
1	5551	-4.8343284	616.31746	-2979.48098	23.3707307	379847.212
1.2		-4.6343284			21.4769993	
1.2		-4.6343284			21.4769993	
1.2	4620	-4.6343284	-314.68254	1458.342217	21.4769993	99025.1008
1.2	4800	-4.6343284	-134.68254	624.163113	21.4769993	18139.3865
1.2	5010	-4.6343284	75.3174603	-349.045842	21.4769993	5672.71983
1.4	5070	-4.4343284	135.31746	-600.042052	19.663268	18310.8151
1.4	5040	-4.4343284	105.31746	-467.012201	19.663268	11091.7674
1.6		-4 2343284			17.9295366	
1.6		-4.2343284			17.9295366	
1.6	4550	-4 2343284	-384.68254	1628.872187	17.9295366	147980.656
1.6	4760	-4.2343284	-174 68254	739.6632315	17 9295366	30513.9897
1.6	4960	-4.2343284	25.3174603	-107.20244	17.9295366	640.973797
1.6	4960	-4.2343284	25 3174603	-107.20244	17.9295366	640 973797
1 6	4943	-4.2343284	8.31746032	-35.2188581	17 9295366	69 1801461

X	Y	Xi - X	Yi - Y	(Xi-X)(Yi-Y)	(Xi-X)	(Yi-Y)
2	4440	-3.8343284	-494.68254	1896.77529	14.702074	244710.815
2	4450	-3.8343284	-484.68254	1858.432007	14.702074	234917.164
2	4500	-3.8343284	-434.68254	1666.715589	14.702074	188948.91
2	4590	-3.8343284	-344.68254	1321.626036	14.702074	118806.053
2	4730	-3.8343284	-204.68254	784.8200663	14.702074	41894.9421
2	5000	-3.8343284	65.3174603	-250.44859	14.702074	4266.37062
2	5120	-3.8343284	185.31746	-710.567993	14.702074	34342.5611
2.4	4460	-3.4343284	-474.68254	1630.215707	11.7946113	225323.513
2.4	4890	-3.4343284	-44.68254	153.4545131	11.7946113	1996.52935
2.4	4861	-3.4343284	-73.68254	253.0500355	11.7946113	5429.11665
2.4	5235	-3.4343284	300.31746	-1031.38877	11.7946113	90190.577
2.6		-3.2343284			10.4608799	
2.6	5000	-3.2343284	65.3174603	-211.258114	10.4608799	4266.37062
2.6	5120	-3.2343284	185.31746	-599.377517	10.4608799	34342.5611
3	4110	-2.8343284	-824.68254	2337.421109	8.03341724	680101.291
3	4640	-2.8343284	-294.68254	835.2270789	8.03341724	86837.7992
3	4860	-2.8343284	-74.68254	211.6748401	8.03341724	5577.48173
3	5220	-2.8343284	285.31746	-808.683369	8.03341724	81406.0532
3	5293	-2.8343284	358.31746	-1015.58934	8.03341724	128391.402
3.2	5280	-2.6343284	345.31746	-909.679578	6.9396859	119244.148
3.4	4820	-2.4343284	-114.68254	279.1749585	5.92595456	13152.0849
3.4	5127	-2.4343284	192.31746	-468.163847	5.92595456	36986.0055
3.4	5799	-2.4343284	864.31746	-2104.0325	5.92595456	747044.672
3.6		-2.2343284			4.99222321	
3.6	4650	-2.2343284	-284.68254	636.0742715	4.99222321	81044.1484
3.8	5289	-2.0343284	354.31746	-720.798057	4.13849187	125540.863
4	5110	-1.8343284	175.31746	-321.589789	3.36476053	30736.2119
4.2	4730	-1.6343284	-204.68254	334.518479	2.67102918	41894.9421
4.6	5130	-1.2343284	195.31746	-241.08588	1.5235665	38148.9103
4.8	5643	-1.0343284	708.31746	-732.632836	1.06983515	501713.625
5	4890	-0.8343284	-44.68254	37.27990997	0.69610381	1996.52935

X	Y	Xi - X	Yi - Y	(Xi-X)(Yi-Y)	(Xi-X)	(Yi-Y)
5	5099	-0.8343284	164.31746	-137.094717	0.69610381	27000.2278
5	5020	-0.8343284	85.3174603	-71.1827766	0.69610381	7279.06904
5	5240	-0.8343284	305.31746	-254.735015	0.69610381	93218.7516
5.2	5040	-0.6343284	105.31746	-66.8058517	0.40237247	11091.7674
5.4	5030	-0.4343284	95.3174603	-41.399076	0.18864112	9085.41824
5.8	5237	-0.0343284	302.31746	-10.3780621	0.00117844	91395.8468
6	4820	0.16567164	-114.68254	-18.9996446	0.02744709	13152.0849
6	5047	0.16567164	112.31746	18.60781805	0.02744709	12615.2119
6	5260	0.16567164	325.31746	53.89587775	0.02744709	105831.45
6.2	5030	0.36567164	95.3174603	34.85489221	0.13371575	9085.41824
6.4	4770	0.56567164	-164.68254	-93.1562426	0.31998441	27120.3389
7	5253	1.16567164	318.31746	371.0536366	1.35879038	101326.006
7.8	5280	1.96567164	345.31746	678.7807392	3.863865	119244.148
8	4510	2.16567164	-424.68254	-919.722933	4.69013366	180355.26
8	4550	2.16567164	-384.68254	-833.096067	4.69013366	147980.656
8	4600	2.16567164	-334.68254	-724.812485	4.69013366	112012.402
9	5140	3.16567164	205.31746	649.9676617	10.0214769	42155.2595
9	5512	3.16567164	577.31746	1827.597512	10.0214769	333295.45
9.4		3.56567164			12.7140143	
11	4196	5.16567164	-738.68254	-3815.79145	26.6841635	545651.894
12	4990	6.16567164	55.3174603	341.0692964	38.0155068	3060.02142
13	4920	7.16567164	-14.68254	-105.210258	51.3468501	215.576972
13.6	4690	7.76567164	-244.68254	-1900.12426	60.305656	59869.5452
14.4	4850	8.56567164	-84.68254	-725.362829	73.3707307	7171.13253
15.4	4520	9.56567164	-414.68254	-3966.71701	91.502074	171961.609
15.6		9.76567164			95.3683426	
15.8	5189	9.96567164	254.31746	2534.444302	99.3146113	64677.3706
16.2	5410	10.3656716	475.31746	4926.984719	107.447149	225926.688
17.8	5260	11.9656716	325.31746	3892.64191	143.177298	105831.45
21	4810	15.1656716	-124.68254	-1890.89446	229.997596	15545.7357
21.6	4530	15.7656716	-404.68254	-6380.09204	248.556402	163767.958

X	Y	Xi - X	Yi - Y	(Xi-X)(Yi-Y)	(Xi-X)	(Yi-Y)
21.6	5300	15.7656716	365.31746	5759.475124	248.556402	133456.847
22	5294	16.1656716	359.31746	5808.608079	261.32894	129109.037
25	4790	19.1656716	-144.68254	-2772.93805	367.322969	20933.0373
26.2	5260	20.3656716	325.31746	6625.308576	414.760581	105831.45
26 6	4893	20.7656716	-41.68254	-865.565932	431.213119	1737.43411
28 8	4880	22 9656716	-54.68254	-1255.82125	527.422074	2990.18015
31	5260	25.1656716	325.31746	8186.832386	633.311029	105831.45
32	4710	26.1656716	-224.68254	-5878.96956	684.642372	50482.2436
32	4860	26 1656716	-74.68254	-1954.11881	684.642372	5577 48173
39	5289	33 1656716	354.31746	11751.17655	1099.96178	125540.863
40	5080	34 1656716	145.31746	4964 868633	1167 29312	21117.1643
5.83432836	4934.68254		SUM =	37478.30794	9671 48209	12982593.3
MEAN X	MEAN Y					

ประวัติผู้เขียน

นาย ไวทยา บุญญรัตน์ เกิดเมื่อวันที่ 9 กรกฎาคม พ.ศ.2511 ที่อุบลราชธานี จบการศึกษาขั้นอุดมศึกษาจากคณะวิศวกรรมศาสตร์ มหาวิทยาลัยขอนแก่น ได้รับปริญญาวิศวกรรมศาสตรบัณฑิต สาขาวิศวกรรมไฟฟ้าในปีการศึกษา 2532 และเข้าศึกษาต่อในหลักสูตรวิศวกรรมศาสตรมหาบัณฑิตที่ จุฬาลงกรณ์มหาวิทยาลัย เมื่อ พ.ศ.2533