

## รายการอ้างอิง

### ภาษาไทย

ปราโมทย์ เคชะอำไพ, ระเบียบวิธีเชิงตัวเลขในงานด้านวิศวกรรม. กรุงเทพฯ:  
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ภาคผนวก

ตารางที่ 5.1 แสดงค่า Mean velocity ตลอดตามแนวยาวท่อ สำหรับการไหลแบบ droplet flow ในกรณีที่ใช้ Langhaar velocity profile ที่  $C = 0.5$   $A = 0.2, 0.6, 1.0$  และ  $S = 15, 100$

X	LANGHAAR VELOCITY PROFILE					
	A=0.2 S=15	A=0.6 S=15	A=1.0 S=15	A=0.2S=100	A=0.6 S=100	A=1.0 S=100
0.0001	0.000021936	0.000021936	0.000021936	0.000144126	0.000144149	0.000144154
0.0002	0.000056721	0.000056724	0.000056725	0.000370747	0.000370863	0.000370886
0.0003	0.000098412	0.000098419	0.00009842	0.000639798	0.000640103	0.000640164
0.0004	0.000144704	0.000144719	0.000144722	0.000935583	0.000936189	0.00093631
0.0005	0.000195831	0.000195857	0.000195862	0.001259033	0.00126008	0.001260289
0.0006	0.000252819	0.000252861	0.000252869	0.001616155	0.001617823	0.001618156
0.0007	0.000316294	0.000316358	0.000316371	0.002010365	0.002012882	0.002013385
0.0008	0.000386156	0.000386249	0.000386268	0.002440496	0.002444133	0.002444859
0.0009	0.000461747	0.000461879	0.000461905	0.002901957	0.002907017	0.002908028
0.001	0.000542138	0.000542318	0.000542354	0.003388559	0.003395365	0.003396723
0.002	0.001516941	0.001518276	0.001518543	0.009006443	0.009050782	0.009059604
0.003	0.00275024	0.002754537	0.002755395	0.01557088	0.015697842	0.015722979
0.004	0.004185705	0.004195538	0.004197501	0.022668473	0.022929644	0.022981036
0.005	0.005788754	0.005807414	0.005811135	0.030075836	0.030525509	0.030613352
0.006	0.007534077	0.00756551	0.007571773	0.037653146	0.038346294	0.038480579
0.007	0.009402426	0.009451188	0.009460893	0.045311058	0.046302585	0.046492905
0.008	0.011371774	0.011442894	0.011457033	0.052960402	0.054303243	0.054558397
0.009	0.013417663	0.013516462	0.013536079	0.060511615	0.062254335	0.062581876
0.01	0.01554555	0.015677972	0.01570423	0.068008656	0.070202971	0.07061058
0.02	0.03993872	0.04082171	0.040993701	0.137867749	0.147953002	0.149545025
0.03	0.066743837	0.069306979	0.069793685	0.190945004	0.219657588	0.223042398
0.04	0.093777	0.099153049	0.100140979	0.2	0.286068034	0.2919043
0.05	0.11989925	0.129435169	0.131117887	0.2	0.347985341	0.357087932
0.06	0.144328721	0.159669256	0.162245148	0.2	0.405823533	0.419266477
0.07	0.166318451	0.189574798	0.193247473	0.2	0.459595395	0.478864515
0.08	0.18487512	0.218990644	0.223971078	0.2	0.508905189	0.536190524
0.09	0.197968291	0.247809429	0.254317836	0.2	0.552597074	0.591416667
0.1	0.2	0.275961599	0.284229973	0.2	0.58761333	0.644645056
0.2	0.2	0.512296054	0.55595574	0.2	0.6	1
0.3	0.2	0.6	0.776369825	0.2	0.6	1
0.4	0.2	0.6	0.940174925	0.2	0.6	1
0.5	0.2	0.6	1	0.2	0.6	1
0.6	0.2	0.6	1	0.2	0.6	1
0.7	0.2	0.6	1	0.2	0.6	1
0.8	0.2	0.6	1	0.2	0.6	1
0.9	0.2	0.6	1	0.2	0.6	1
1	0.2	0.6	1	0.2	0.6	1

ตารางที่ 5.2 แสดงค่า Mean velocity ตลอดตามแนวยาวท่อ สำหรับการไหลแบบ  
droplet flow ในกรณีที่ใช้ Parabolic velocity profile ที่  $C = 0.5$   $A = 0.2, 0.6, 1.0$  และ  
 $S = 15, 100$

X	PALABOLIC VELOCITY PROFILE					
	A=0.2 S=100	A=0.6 S=100	A=1.0 S=100	A=0.2 S=15	A=0.6 S=15	A=1.0 S=15
0.0001	7.56E-05	7.56E-05	7.56E-05	1.13E-05	1.13E-05	1.13E-05
0.0002	1.96E-04	1.96E-04	1.96E-04	3.00E-05	3.00E-05	3.00E-05
0.0003	3.49E-04	3.49E-04	3.49E-04	5.47E-05	5.47E-05	5.47E-05
0.0004	5.31E-04	5.31E-04	5.31E-04	8.46E-05	8.46E-05	8.46E-05
0.0005	7.37E-04	7.37E-04	7.37E-04	1.19E-04	1.19E-04	1.19E-04
0.0006	9.64E-04	9.64E-04	9.64E-04	1.58E-04	1.58E-04	1.58E-04
0.0007	1.21E-03	1.21E-03	1.21E-03	2.01E-04	2.01E-04	2.01E-04
0.0008	1.47E-03	1.47E-03	1.47E-03	2.47E-04	2.47E-04	2.47E-04
0.0009	1.75E-03	1.75E-03	1.75E-03	2.98E-04	2.98E-04	2.98E-04
0.001	2.04E-03	2.04E-03	2.04E-03	3.51E-04	3.51E-04	3.51E-04
0.002	5.57E-03	5.59E-03	5.59E-03	1.05E-03	1.05E-03	1.05E-03
0.003	9.83E-03	9.88E-03	9.89E-03	1.98E-03	1.98E-03	1.98E-03
0.004	1.45E-02	1.46E-02	1.46E-02	3.09E-03	3.10E-03	3.10E-03
0.005	1.95E-02	1.97E-02	1.97E-02	4.37E-03	4.38E-03	4.38E-03
0.006	2.47E-02	2.50E-02	2.50E-02	5.78E-03	5.80E-03	5.80E-03
0.007	3.00E-02	3.04E-02	3.05E-02	7.31E-03	7.34E-03	7.34E-03
0.008	3.55E-02	3.59E-02	3.60E-02	8.94E-03	8.99E-03	9.00E-03
0.009	4.09E-02	4.16E-02	4.17E-02	1.07E-02	1.07E-02	1.07E-02
0.01	4.65E-02	4.73E-02	4.74E-02	1.25E-02	1.26E-02	1.26E-02
0.02	1.02E-01	1.06E-01	1.06E-01	3.38E-02	3.44E-02	3.46E-02
0.03	1.53E-01	1.64E-01	1.65E-01	5.84E-02	6.02E-02	6.06E-02
0.04	1.95E-01	2.21E-01	2.24E-01	8.39E-02	8.79E-02	8.87E-02
0.05	0.2	2.79E-01	2.81E-01	1.09E-01	1.17E-01	1.18E-01
0.06	0.2	3.31E-01	3.38E-01	1.34E-01	1.46E-01	1.48E-01
0.07	0.2	3.84E-01	3.94E-01	1.56E-01	1.75E-01	1.78E-01
0.08	0.2	4.35E-01	4.48E-01	1.76E-01	2.04E-01	2.08E-01
0.09	0.2	4.82E-01	5.02E-01	1.92E-01	2.32E-01	2.38E-01
0.1	0.2	5.27E-01	5.55E-01	0.2	2.60E-01	2.67E-01
0.2	0.2	0.6	9.84E-01	0.2	5.00E-01	5.40E-01
0.3	0.2	0.6	1	0.2	0.6	7.63E-01
0.4	0.2	0.6	1	0.2	0.6	9.31E-01
0.5	0.2	0.6	1	0.2	0.6	1
0.6	0.2	0.6	1	0.2	0.6	1
0.7	0.2	0.6	1	0.2	0.6	1
0.8	0.2	0.6	1	0.2	0.6	1
0.9	0.2	0.6	1	0.2	0.6	1
1	0.2	0.6	1	0.2	0.6	1

ตารางที่ 5.3 แสดงค่า local Nusselt number ตลอดตามแนวยาวท่อ สำหรับการไหลแบบ droplet flow ในกรณีที่ใช้ Langhaar velocity profile ที่  $C = 0.5$   $A = 0.2, 0.6, 1.0$  และ  $S = 0, 15, 100$

X	LANGHAAR VELOCITY PROFILE						
	A=0.2S=15	A=0.6S=15	A=1.0 S=15	A=0.2S=100	A=0.6 S=100	A=1.0 S=100	S=0
0.0001	87.04185599	87.04185599	87.04185599	87.42588367	87.42588367	87.42588367	86.97310252
0.0002	64.80667651	64.80668083	64.80668078	65.76516945	65.76530501	65.76532989	64.63399046
0.0003	49.96608953	49.96610429	49.96611067	51.56129401	51.56187484	51.56199027	49.6766793
0.0004	40.43114086	40.4311802	40.43118359	42.6286631	42.63006368	42.630343	40.02953907
0.0005	34.43998879	34.44005518	34.44006641	37.15591277	37.15848091	37.15900291	33.94005102
0.0006	30.59898999	30.59909544	30.59911149	33.74537571	33.7494058	33.75022183	30.01577435
0.0007	27.99402648	27.9941787	27.99420364	31.50008456	31.50584684	31.50700275	27.33980723
0.0008	26.09816881	26.09837342	26.09840942	29.91234506	29.92011918	29.92166477	25.38186463
0.0009	24.622827	24.623084	24.62313823	28.70840539	28.71847531	28.72049577	23.85069737
0.001	23.41044009	23.41076914	23.4108293	27.74094177	27.75362957	27.75617795	22.58690308
0.002	17.13856254	17.14011617	17.14042031	23.19124553	23.24379436	23.254246	15.91362807
0.003	14.59070172	14.59432481	14.59504358	21.63432788	21.74482637	21.76665144	13.07735098
0.004	13.19966785	13.2061315	13.20741756	20.87640916	21.05646854	21.09177467	11.45239369
0.005	12.3044697	12.31452448	12.31651987	20.39294705	20.65099015	20.70111386	10.35899321
0.006	11.67968347	11.69402669	11.69687304	20.03271992	20.37499595	20.44081209	9.561433083
0.007	11.21647389	11.23577819	11.23960529	19.72981993	20.1613996	20.2434797	8.945337243
0.008	10.84745035	10.8723163	10.87725607	19.44446469	19.9697009	20.0683762	8.440079661
0.009	10.54089695	10.57190975	10.57804294	19.16629315	19.78887278	19.9043121	8.010552209
0.01	10.33756188	10.37530196	10.38276402	18.95563124	19.67868375	19.81093105	7.689248484
0.02	9.244116148	9.373576035	9.398552042	16.45910977	18.47887003	18.78382844	5.871468325
0.03	8.784849026	9.039237227	9.086501933	12.72331708	17.46088351	17.94779875	5.101297353
0.04	8.436920095	8.842898158	8.914706595	6.299025619	16.53224289	17.21954857	4.666379012
0.05	8.103742896	8.690956177	8.788428883	5.278828125	15.6534299	16.57071207	4.391873798
0.06	7.744778087	8.554079148	8.678003048	4.780558857	14.78434362	15.97713252	4.206207257
0.07	7.327651134	8.42416278	8.575231338	4.474883472	13.88502017	15.42449575	4.075751541
0.08	6.793827888	8.298780259	8.477806723	4.269489287	12.89722151	14.90215637	3.982122819
0.09	5.940275534	8.175153266	8.383190706	4.123448237	11.70414424	14.39975662	3.912671136
0.1	4.614515047	8.053499521	8.291829749	4.016846194	9.958229951	13.9102729	3.860615897
0.2	3.71430251	6.794337768	7.514455432	3.697397632	3.848831823	5.208657015	3.688026271
0.3	3.655735595	3.943741063	6.847844281	3.654971279	3.671071748	3.819061246	3.654376616
0.4	3.653614926	3.679939433	6.048491285	3.653574567	3.655280285	3.679384064	3.654000819
0.5	3.653469013	3.656157913	3.952879505	3.653457096	3.653731416	3.657636626	3.654435259
0.6	3.65337187	3.653822871	3.695616832	3.653352803	3.653591395	3.654236406	3.655367055
0.7	3.653201081	3.653608139	3.660171067	3.653166152	3.653597673	3.65371648	3.655367055
0.8	3.652887331	3.653611525	3.654644926	3.652823079	3.653630018	3.653653371	3.655367055
0.9	3.652309933	3.653650661	3.653797034	3.652191625	3.653683343	3.653669892	3.655367055
1	3.651246011	3.653715854	3.653689856	3.651027806	3.653767883	3.653710534	3.655367055

ตารางที่ 5.4 แสดงค่า local Nusselt number ตลอดตามแนวยาวท่อ สำหรับการไหลแบบ droplet flow ในกรณีที่ใช้ Parabolic velocity profile ที่  $C = 0.5$   $A = 0.2, 0.6, 1.0$  และ  $S = 0, 15, 100$

X	PARABOLIC VELOCITY PROFILE						
	A=0.2 S=100	A=0.6 S=100	A=1.0 S=100	A=0.2 S=15	A=0.6 S=15	A=1.0 S=15	S=0.0
0.0001	43.05372	43.05372	43.05372	43.05373	43.05373	43.05373	43.05374
0.0002	30.0792	30.0792	30.0792	27.60504	27.60504	27.60504	27.16819
0.0003	26.24406	26.24437	26.24444	22.49492	22.49493	22.49493	21.81242
0.0004	24.44576	24.44669	24.44689	19.92903	19.92905	19.92905	19.08973
0.0005	23.37464	23.3765	23.37685	18.31001	18.31006	18.31007	17.35374
0.0006	22.65553	22.65857	22.65918	17.16155	17.16163	17.16165	16.10999
0.0007	22.13769	22.14216	22.14306	16.2896	16.28972	16.28974	15.15651
0.0008	21.74697	21.75308	21.7543	15.59739	15.59756	15.59759	14.39244
0.0009	21.442	21.44999	21.45158	15.03021	15.03044	15.03048	13.76063
0.001	21.19777	21.20782	21.20981	14.55433	14.55463	14.55468	13.22575
0.002	20.11499	20.15412	20.16191	12.03742	12.03882	12.0391	10.28388
0.003	19.76265	19.84174	19.85742	10.96787	10.97114	10.97178	8.92847
0.004	19.56719	19.69321	19.71808	10.35718	10.36299	10.36415	8.09553
0.005	19.41858	19.59653	19.63143	9.959332	9.968338	9.970138	7.513957
0.006	19.2847	19.5184	19.56391	9.679506	9.692322	9.694875	7.077028
0.007	19.1543	19.4469	19.50341	9.472397	9.489616	9.49304	6.732716
0.008	19.02307	19.37733	19.44519	9.313353	9.335513	9.3399	6.452105
0.009	18.88937	19.30781	19.38726	9.187687	9.215274	9.22074	6.217622
0.01	18.75261	19.23767	19.32889	9.086054	9.11955	9.126181	6.017864
0.02	17.20296	18.50336	18.7197	8.60616	8.720469	8.742635	4.921663
0.03	15.18509	17.76193	18.11496	8.380186	8.605265	8.647514	4.443207
0.04	11.5549	17.03579	17.53973	8.170831	8.531203	8.595953	4.173647
0.05	5.648495	16.32074	16.99473	7.936334	8.458145	8.546793	4.004966
0.06	4.83124	15.60599	16.4763	7.661383	8.378611	8.492173	3.893899
0.07	4.438674	14.87657	15.98023	7.329108	8.292335	8.431657	3.818885
0.08	4.202507	14.1112	15.50235	6.905895	8.200605	8.366542	3.767582
0.09	4.046475	13.27603	15.0387	6.301215	8.10466	8.298284	3.732287
0.1	3.938294	12.3085	14.58526	4.859623	8.005582	8.228094	3.707939
0.2	3.66643	3.894297	8.809571	3.686179	6.864429	7.535363	3.654902
0.3	3.654163	3.677052	3.891645	3.655063	4.002579	6.893536	3.65358
0.4	3.65361	3.655831	3.690411	3.65365	3.684298	6.118917	3.653516
0.5	3.653598	3.653698	3.659342	3.653603	3.656524	4.002462	3.653455
0.6	3.653622	3.653429	3.654463	3.653624	3.653738	3.701053	3.653342
0.7	3.6535	3.6534	3.6541	3.6535	3.6536	3.66097	3.653229
0.8	3.6535	3.6534	3.6536	3.6535	3.6536	3.6547	3.653116
0.9	3.6535	3.6534	3.6535	3.6535	3.6536	3.6537	3.653003
1	3.6535	3.6534	3.6535	3.6535	3.6535	3.6535	3.65289

ตารางที่ 5.5 แสดงค่า bulk mean temperature ตลอดตามแนวยาวท่อ สำหรับการไหลแบบ droplet flow ในกรณีที่ใช้ Langhaar velocity profile ที่  $C = 0.5$   $A = 0.2, 0.6, 1.0$  และ  $S = 0, 15, 100$

X	LANGHAAR VELOCITY PROFILE						
	A=0.2S=15	A=0.6S=15	A=1.0 S=15	A=0.2S=100	A=0.6 S=100	A=1.0 S=100	S=0
0.0001	0.014732112	0.014732112	0.014732112	0.014520768	0.014520768	0.014520768	0.01477007
0.0002	0.023465235	0.023465233	0.023465233	0.022939486	0.022939416	0.022939403	0.023560379
0.0003	0.028191483	0.028191476	0.028191473	0.027311756	0.027311464	0.027311407	0.028352037
0.0004	0.031356105	0.031356086	0.031356083	0.03008972	0.030089006	0.030088863	0.031589293
0.0005	0.034692341	0.034692305	0.034692298	0.032978442	0.032977041	0.03297676	0.035010746
0.0006	0.038751953	0.038751889	0.038751878	0.036508482	0.036506047	0.036505558	0.039172318
0.0007	0.043265878	0.043265775	0.043265757	0.040418541	0.040414646	0.040413865	0.043803779
0.0008	0.047731743	0.047731588	0.04773156	0.044233429	0.044227593	0.044226427	0.048397889
0.0009	0.051758073	0.051757852	0.051757809	0.047590808	0.047582523	0.047580864	0.052557823
0.001	0.055147302	0.055147	0.055146939	0.050314883	0.050303633	0.050301379	0.056081953
0.002	0.078409447	0.078407034	0.07840655	0.066395077	0.06631781	0.066302436	0.080920819
0.003	0.093492348	0.093484556	0.093483005	0.074023786	0.07380622	0.07376319	0.097876495
0.004	0.10769403	0.107676136	0.107672559	0.080413773	0.079971538	0.079884679	0.11428528
0.005	0.11987245	0.119838591	0.119831842	0.084985437	0.084237963	0.084092397	0.128883283
0.006	0.130718074	0.130661369	0.130650082	0.088529572	0.087400078	0.087182272	0.142326882
0.007	0.140329681	0.140242422	0.140225067	0.091265185	0.089683521	0.089381867	0.154667893
0.008	0.148206682	0.148080904	0.148055908	0.09292472	0.090834546	0.090440749	0.1653193
0.009	0.154650624	0.154477973	0.15444372	0.093793604	0.091146417	0.09065428	0.174560544
0.01	0.164238257	0.164005561	0.163959465	0.097067958	0.093746091	0.093137323	0.187382973
0.02	0.215869336	0.214448867	0.214173192	0.112070877	0.098842614	0.096863953	0.270963851
0.03	0.24865387	0.244810801	0.244087047	0.139104508	0.102873127	0.099154502	0.335405339
0.04	0.273499481	0.265908796	0.264534615	0.219691869	0.107724059	0.101850932	0.389216712
0.05	0.295225222	0.282424954	0.280219605	0.285045173	0.113838016	0.105233601	0.436407649
0.06	0.315916211	0.296177199	0.2929786	0.337736357	0.121249915	0.109099729	0.478545532
0.07	0.337203094	0.308273701	0.303931723	0.38312959	0.130321287	0.113423831	0.516729623
0.08	0.360810315	0.31937887	0.313749461	0.423561491	0.14175182	0.118225182	0.551692256
0.09	0.389773182	0.329749249	0.322690946	0.460117736	0.156823581	0.123433341	0.583776841
0.1	0.432616538	0.339693593	0.331062401	0.4936337	0.179166368	0.129128622	0.613394514
0.2	0.700549659	0.437538439	0.402150415	0.726355378	0.522094188	0.280598834	0.81393131
0.3	0.836767894	0.605363147	0.467492844	0.850703989	0.698577072	0.525743188	0.910088967
0.4	0.911189449	0.753321141	0.540463884	0.918768883	0.809206339	0.673292571	0.956681564
0.5	0.951676976	0.843928011	0.658780317	0.955801309	0.87914408	0.773506421	0.979129763
0.6	0.973708476	0.901144813	0.766166601	0.975952776	0.923444507	0.842826675	0.989945895
0.7	0.985697158	0.937383508	0.838013522	0.986918419	0.951511027	0.890915745	0.995157399
0.8	0.992220935	0.960342273	0.88760549	0.992885498	0.969292902	0.924291369	0.997668443
0.9	0.995770921	0.974888055	0.921997053	0.99613255	0.98055884	0.947456952	0.998878331
1	0.997702686	0.984103722	0.945864837	0.997899471	0.987696523	0.963536058	0.999461288



ตารางที่ 5.6 แสดงค่า bulk mean temperature ตลอดตามแนวยาวท่อ สำหรับการไหลแบบ droplet flow ในกรณีที่ใช้ Parabolic velocity profile ที่  $C = 0.5$   $A = 0.2, 0.6, 1.0$  และ  $S = 0, 15, 100$

X	PARABOLIC VELOCITY PROFILE						
	A=0.2 S=100	A=0.6 S=100	A=1.0 S=100	A=0.2 S=15	A=0.6 S=15	A=1.0 S=15	S=0.0
0.0001	0.007589	0.007589	0.007589	0.007589	0.007589	0.007589	0.007589
0.0002	0.012078	0.0120775	0.0120775	0.012547	0.0125471	0.012547	0.0126299
0.0003	0.015514	0.0155141	0.0155141	0.016586	0.016586	0.016586	0.01678087
0.0004	0.0183707	0.01834704	0.0183704	0.020119	0.020119	0.020119	0.0204445
0.0005	0.020838	0.02083737	0.020837	0.023312	0.023312	0.023312	0.023782
0.0006	0.023019	0.02301793	0.023018	0.026255	0.0262553	0.0262553	0.0268817
0.0007	0.024978	0.02497575	0.024975	0.029	0.029	0.029	0.029794718
0.0008	0.026557	0.02675365	0.026753	0.03159	0.03159	0.03159	0.032557016
0.0009	0.028387	0.028382	0.0283812	0.034045	0.034045	0.034045	0.0351937
0.001	0.029891	0.029884	0.0298829	0.03638	0.036386	0.036386	0.0377234
0.002	0.0406118	0.0405638	0.04055427	0.055745	0.055744	0.0557433	0.059245967
0.003	0.0471759	0.0470413	0.0470147	0.0708466	0.07084	0.070839	0.076851982
0.004	0.05174277	0.0514775	0.0514251	0.0835415	0.083526	0.0835234	0.092275298
0.005	0.0551708	0.05473185	0.0546457	0.0946085	0.0945798	0.094574	0.106231773
0.006	0.0578895	0.05723	0.05711047	0.1044709	0.104423	0.104413	0.119105157
0.007	0.06014262	0.05924	0.05906705	0.1133925	0.1133186	0.113304	0.131131413
0.008	0.06208	0.0608951	0.0606681	0.1215522	0.1214454	0.121424	0.142468702
0.009	0.063798	0.06229753	0.062013	0.1290787	0.1289313	0.1289	0.15322959
0.01	0.0653621	0.0635154	0.0631685	0.136069	0.1358725	0.1358336	0.163497788
0.02	0.078603	0.07154837	0.07039556	0.187714	0.1865154	0.1862816	0.248657662
0.03	0.094742	0.077739	0.0755035	0.222278	0.219018	0.218399	0.315420125
0.04	0.1246184	0.0839525	0.0803363	0.249344	0.24285886	0.2416694	0.371763481
0.05	0.20656911	0.09056247	0.0851924	0.27281	0.2618132	0.259883	0.421000837
0.06	0.272094	0.0977684	0.09015576	0.294764	0.277581	0.27493	0.464910273
0.07	0.325961	0.10578435	0.0952677	0.3166433	0.2917424	0.29934	0.504581112
0.08	0.3726762	0.1149119	0.10056	0.3397992	0.3044	0.29934	0.54073781
0.09	0.414282	0.1256298	0.10607	0.3661867	0.3161325	0.3097473	0.573890797
0.1	0.45194	0.1387874	0.11183532	0.40246698	0.327215	0.319364	0.604417071
0.2	0.7060853	0.47877996	0.21013956	0.688504	0.429103	0.396244	0.809944969
0.3	0.8401738	0.6737709	0.488788	0.8307855	0.592419	0.4631635	0.908433832
0.4	0.91303632	0.79356908	0.6489755	0.907932	0.745839	0.5351088	0.955881816
0.5	0.952683	0.86923205	0.75677	0.949905	0.8392244	0.6497257	0.978743428
0.6	0.974257	0.91715995	0.8312247	0.9727456	0.8981626	0.7604	0.989758778
0.7	0.985997	0.947524	0.882863	0.9851744	0.93549	0.83406	0.995069823
0.8	0.9923853	0.9667612	0.918701	0.991938	0.95914	0.884868	0.9976235
0.9	0.99586163	0.978949	0.94357582	0.9956181	0.974118	0.9201	0.998856
1	9.98E-01	0.986671	0.960841	0.9976208	0.98361	0.9445	0.99945

ตารางที่ 5.7 แสดงค่า droplet diameter ตลอดตามแนวยาวท่อ สำหรับการไหลแบบ droplet flow ในกรณีที่ใช้ Parabolic velocity profile ที่  $C = 0.5$   $A = 0.2, 0.6, 1.0$  และ  $S = 15, 100$

X	LANGHAAR VELOCITY PROFILE					
	A=0.2 S=15	A=0.6 S=15	A=1.0 S=15	A=0.2 S=100	A=0.6 S=100	A=1.0 S=100
0.0001	0.999963439	0.999987813	0.999992688	0.999759732	0.999919911	0.999951946
0.0002	0.999905455	0.999968486	0.999981091	0.999381706	0.999793923	0.999876356
0.0003	0.999835954	0.99994532	0.999967192	0.998932531	0.999644261	0.999786567
0.0004	0.999758768	0.999919594	0.999951757	0.998438257	0.999479624	0.999687799
0.0005	0.999673508	0.999891179	0.999934708	0.997897193	0.999299465	0.999579727
0.0006	0.999578457	0.999859502	0.999915703	0.99729912	0.9991004	0.999460323
0.0007	0.999472565	0.999824215	0.999894532	0.996638102	0.998880479	0.999328421
0.0008	0.999355993	0.999785371	0.999871227	0.99591585	0.998640301	0.999184382
0.0009	0.999229829	0.999743335	0.999846008	0.995139822	0.998382375	0.999029716
0.001	0.999095619	0.999698621	0.999819182	0.994320202	0.998110117	0.998866474
0.002	0.997465347	0.999155801	0.999493562	0.984758127	0.994946291	0.996970966
0.003	0.995395094	0.998467354	0.99908069	0.973344321	0.991201795	0.994731296
0.004	0.992974584	0.997663691	0.998598871	0.960694535	0.9870955	0.992280213
0.005	0.990257468	0.996763194	0.998059191	0.947127361	0.982745375	0.98968961
0.006	0.987282147	0.995779148	0.997469678	0.932834561	0.978225831	0.987005002
0.007	0.984077096	0.994721527	0.996836371	0.91793041	0.97358472	0.984255786
0.008	0.980676033	0.99360199	0.996166311	0.902543421	0.968872676	0.981472728
0.009	0.97711762	0.992433751	0.995467461	0.886821101	0.964143971	0.978688417
0.01	0.97338888	0.991213031	0.994737613	0.870639739	0.959369903	0.975886345
0.02	0.928436267	0.97678658	0.986144341	0.677270828	0.909935862	0.94743722
0.03	0.873411897	0.959910428	0.976172183	0.356412396	0.859029026	0.919318021
0.04	0.809834344	0.941567073	0.96543897	0	0.805801556	0.891313845
0.05	0.737115482	0.922194951	0.954231214	0	0.748901773	0.863078953
0.06	0.652930677	0.902005644	0.942697417	0	0.686565211	0.83430651
0.07	0.552230893	0.881104852	0.930922323	0	0.616230779	0.804730043
0.08	0.422883438	0.859530846	0.918951595	0	0.53347511	0.774069352
0.09	0.216576188	0.837289211	0.906813378	0	0.429092938	0.742039258
0.1	0	0.814357465	0.894522295	0	0.274326677	0.708305783
0.2	0	0.526771975	0.762913711	0	0	0
0.3	0	0	0.606983382	0	0	0
0.4	0	0	0.391105945	0	0	0
0.5	0	0	0	0	0	0
0.6	0	0	0	0	0	0
0.7	0	0	0	0	0	0
0.8	0	0	0	0	0	0
0.9	0	0	0	0	0	0
1	0	0	0	0	0	0

ตารางที่ 5.8 แสดงค่า droplet diameter ตลอดตามแนวยาวท่อ สำหรับการไหลแบบ droplet flow ในกรณีที่ใช้ Parabolic velocity profile ที่  $C = 0.5$   $A = 0.2, 0.6, 1.0$  และ  $S = 15, 100$

X	PARABOLIC VELOCITY PROFILE					
	A=0.2 S=100	A=0.6 S=100	A=1.0 S=100	A=0.2 S=15	A=0.6 S=15	A=1.0 S=15
0.0001	0.999874	0.999958	0.999975	0.999981	0.9999937	0.99999622
0.0002	0.999674	0.999891	0.9999348	0.99995	0.9999833	0.99998999
0.0003	0.999417	0.9998058	0.9998835	0.999909	0.9999696	0.99998176
0.0004	0.999114	0.9997047	0.999823	0.999859	0.999953	0.9999718
0.0005	0.99877	0.99959	0.9997541	0.9998014	0.9999338	0.99996028
0.0006	0.99839	0.999464	0.9996783	0.9997366	0.99991221	0.99994732
0.0007	0.997979	0.999327	0.999596	0.999665	0.9998884	0.99993303
0.0008	0.9975386	0.99918	0.999508	0.9995874	0.9998625	0.99991748
0.0009	0.9970717	0.999025	0.999415	0.9995037	0.9998346	0.99990075
0.001	0.99658027	0.99886	0.999317	0.9994143	0.9998048	0.99988289
0.002	0.990624	0.996885	0.9981325	0.9982535	0.99941816	0.9996509
0.003	0.98334	0.994483	0.996694	0.996695	0.9988995	0.9993398
0.004	0.9751699	0.991808	0.9950946	0.994815	0.9982748	0.998965
0.005	0.9663435	0.9889421	0.993384	0.9928828	0.9975604	0.998537
0.006	0.956995	0.985935	0.9915925	0.990271	0.996768	0.998062
0.007	0.947207	0.9828204	0.98974	0.987665	0.995906	0.9975458
0.008	0.937033	0.9796187	0.98784	0.984865	0.994982	0.9969924
0.009	0.926507	0.976346	0.985902	0.9818869	0.994	0.9964054
0.01	0.91565	0.9730135	0.983933	0.97874411	0.9929688	0.9957877
0.02	0.7890424	0.93751469	0.963256	0.9400998	0.980489	0.9883455
0.03	0.615427	0.8991274	0.941545	0.8913707	0.965359	0.9793864
0.04	0.30044	0.8579255	0.91904	0.8342131	0.948533	0.969511
0.05	0	0.8134424	0.8957263	0.7684767	0.9304784	0.959023
0.06	0	0.76492972	0.871531	0.6926471	0.9114463	0.948095
0.07	0	0.7112845	0.846355	0.6033448	0.891576	0.936832
0.08	0	0.6508211	0.8200767	0.4932476	0.8709403	0.9252997
0.09	0	0.5807583	0.7925492	0.34197923	0.8495696	0.9134243
0.1	0	0.49590918	0.7635912	0	0.8274646	0.901579
0.2	0	0	0.2540998	0	0.5505403	0.7721644
0.3	0	0	0	0	0	0.6185478
0.4	0	0	0	0	0	0.40924
0.5	0	0	0	0	0	0
0.6	0	0	0	0	0	0
0.7	0	0	0	0	0	0
0.8	0	0	0	0	0	0
0.9	0	0	0	0	0	0
1	0	0	0	0	0	0

รูปที่ 5.9 กราฟแสดงการเปลี่ยนแปลงของค่า local Nusselt number ตามการเปลี่ยนแปลงของ wall superheat parameter ที่  $A=0.6$ ,  $S=60$  และ  $C = 1,5,10$  ในกรณีที่ใช้ Langhaar velocity profile และ parabolic velocity profile

X	LANGHAAR VELOCITY PROFILE			PARABOLIC VELOCITY PROFILE		
	S=60 C=1.0	s=60 c=5.0	s=60 c=10	s=60 c=1.0	s=60 c=5.0	s=60 c=10
0.0001	87.24633481	87.24633481	87.24633481	44.74093246	44.74093246	44.74093246
0.0002	65.31936707	65.32692575	65.33527709	29.79856471	29.79905136	29.79962152
0.0003	50.82226033	50.83779822	50.85448365	25.03379967	25.03310536	25.03233089
0.0004	41.6139382	41.63339043	41.65390179	22.74353597	22.74042676	22.73697846
0.0005	35.90562425	35.9250953	35.94538986	21.35366181	21.34704343	21.33981697
0.0006	32.30115124	32.31836208	32.33621331	20.40111807	20.38997047	20.37798996
0.0007	29.89535234	29.90902127	29.92330548	19.70032734	19.68369547	19.66607573
0.0008	28.17145844	28.18065412	28.19062992	19.16014493	19.13713148	19.11309858
0.0009	26.84876791	26.85260206	26.85760583	18.72969883	18.69946911	18.66832203
0.001	25.77518127	25.77272317	25.77210374	18.37802158	18.33979468	18.30090546
0.002	20.51609138	20.40427489	20.31834568	16.7035706	16.5516663	16.41299272
0.003	18.59710458	18.32153403	18.12752444	16.11464381	15.80934585	15.553388
0.004	17.64146136	17.17619993	16.87201711	15.81324979	15.33460555	14.96065625
0.005	17.05685079	16.39144666	15.98238074	15.62293483	14.96217984	14.47587907
0.006	16.65630864	15.78909787	15.28229519	15.48335566	14.63821961	14.04702403
0.007	16.35383783	15.28794288	14.69012963	15.36916758	14.34102638	13.65220189
0.008	16.09715928	14.83792968	14.15442916	15.26838785	14.06055368	13.28035074
0.009	15.86709782	14.42039465	13.65428083	15.17489288	13.79162078	12.92483217
0.01	15.71836103	14.08889646	13.2403759	15.08540681	13.53122311	12.58105406
0.02	14.37278112	11.03230669	8.02566824	14.2307971	11.10141703	8.903345358
0.03	13.28229811	6.771234746	6.138110293	13.38737351	7.433877087	5.591535704
0.04	12.26438005	5.649478053	5.405612095	12.55467912	5.330956619	4.945489866
0.05	11.2395139	5.103420532	4.966390437	11.7098553	4.798637065	4.590258699
0.06	10.0819192	4.756534162	4.668045487	10.80309042	4.492234045	4.358642479
0.07	8.43000219	4.513956133	4.452446216	9.72735104	4.288365373	4.195339897
0.08	5.608013262	4.335994224	4.291295197	8.119781806	4.142951186	4.07500418
0.09	4.958879936	4.200265387	4.166851588	5.345652423	4.035022074	3.983894034
0.1	4.61388988	4.095003567	4.069558196	4.756004596	3.952927925	3.913712834
0.2	3.757635488	3.718306231	3.716041816	3.739692585	3.682676752	3.679005453
0.3	3.662239655	3.65841104	3.658190538	3.662047533	3.656425868	3.656063589
0.4	3.654411511	3.654036729	3.654015285	3.654392894	3.653841581	3.653806279
0.5	3.653650049	3.653617571	3.653615931	3.653647011	3.653597807	3.653595002
0.6	3.653590175	3.653594047	3.653594635	3.653587976	3.653591275	3.653592066
0.7	3.653608298	3.653619855	3.653621097	3.653605082	3.653618282	3.653620047
0.8	3.653648044	3.653666843	3.653668837	3.653642987	3.653664633	3.653667474
0.9	3.653711962	3.65374174	3.653744897	3.653703969	3.653738274	3.653742771
1	3.653813176	3.653860319	3.653865317	3.653800528	3.653854833	3.653861955

## ประวัติผู้เขียน

ข้าพเจ้า นาย วรภัทร์ ระหว่างงำน เกิดเมื่อวันที่ 16 มกราคม พุทธศักราช 2517 ที่ จังหวัดราชบุรี ข้าพเจ้ามีบิดาชื่อ นายเสน่ห์ ระหว่างงำน และมีมารดาชื่อ นางจรัส ระหว่างงำน ได้รับการศึกษาในระดับปริญญาตรี จากมหาวิทยาลัยเกษตรศาสตร์ ภาควิชาวิศวกรรมเครื่องกล พุทธศักราช 2534-2538 และได้เข้าศึกษาต่อในระดับปริญญา มหาบัณฑิตที่ จุฬาลงกรณ์ มหาวิทยาลัย พุทธศักราช 2538

