Farenheit 104

psia 100

PR-EOS REQUIRED COEFFICIENTS

	Tr	b	ao	alpha	at
0	0.846696	0.902356	37889.693154	1.098625	41626.552197

The Iteration results

	zg	zl	fg	fl	fg - fl	pressure	Vmg	Vml	ρg	ρl
0	0.8938	0.0247	90.2763	156.9837	66.7074	100.00	54.0677	1.4953	0.033785	0.532202
1	0.8938	0.0247	90.2844	156.9787	66.6942	100.01	54.0616	1.4952	0.033785	0.532202
2	0.8938	0.0247	90.2927	156.9970	66.7043	100.02	54.0557	1.4953	0.033785	0.532202
3	0.8937	0.0247	90.2998	156.9478	66.6480	100.03	54.0489	1.4951	0.033785	0.532202
4	0.8937	0.0247	90.3081	156.9662	66.6581	100.04	54.0429	1.4952	0.033785	0.532202
...	...	...	...	...	...	...	...	...	...	...
9889	0.7657	0.0486	160.8098	160.8341	0.0243	198.89	23.2893	1.4781	0.033785	0.532202
9890	0.7657	0.0486	160.8161	160.8315	0.0154	198.90	23.2877	1.4780	0.033785	0.532202
9891	0.7657	0.0486	160.8228	160.8414	0.0186	198.91	23.2862	1.4781	0.033785	0.532202
9892	0.7657	0.0486	160.8271	160.8159	0.0112	198.92	23.2841	1.4780	0.033785	0.532202
9893	0.7656	0.0486	160.8337	160.8257	0.0079	198.93	23.2826	1.4780	0.033785	0.532202

9894 rows × 10 columns

Calculated results

	zg	zl	fg	fl	fg - fl	pressure	Vmg	Vml	ρg	ρl
9893	0.7656	0.0486	160.8337	160.8257	0.0079	198.93	23.2826	1.478	0.033785	0.532202

Reading from the charts

	zg	zl	pressure	ρg	ρl
0	0.75	0.05	200	0.03	0.475

Fig 1: Vapour pressure of pure substance

mixture	assignment
°F	160
psia	2000
ng	0.01
k (C_1)	2
k (n-C_4)	0.19
k (n-C_{10})	0.018

	component	name	zj	tc	pc	w	k	tr	b	ac	alpha	aT
0	C_1	Methane	0.5523	343.0	666.4	0.0104	2.000	1.8066	0.4298	9297.3418	0.7492	6966.5686
1	n-C_4	n-Butane	0.3630	765.3	550.6	0.1995	0.190	0.8097	1.1605	56018.6661	1.1391	63810.8626
2	n-C_{10}	n-Decane	0.0838	1111.7	305.2	0.4894	0.018	0.5574	3.0413	213253.5287	1.6124	343849.9897

	0
ng	0.2128

	component	zj	k	xj	yj
0	C_1	0.5523	2.0	0.455430	0.910860
1	n-C_4	0.363	0.19	0.438558	0.083326
2	n-C_{10}	0.0838	0.018	0.105925	0.001907
∑xj, yj				0.999912	0.996093

	aT	b	A	B
liquid	44153.508379	1.026839	1.996701	0.308810
gas	9568.083884	0.493986	0.432686	0.148661

	aT	b	A	B	z
liquid	44153.508379	1.026839	1.996701	0.308810	0.493976
gas	9568.083884	0.493986	0.432686	0.148661	0.824688

	component	liquid		gas	
		Aj	Bj	Aj	Bj
0	C_1	0.781011	0.418566	1.704589	0.870065
1	n-C_4	2.404113	1.130168	5.10021	2.349256
2	n-C_{10}	5.559638	2.961809	11.736781	6.156651

	component	fug_l	fug_g
0	C_1	1.590653	0.871029
1	n-C_4	0.087392	0.282731
2	n-C_{10}	0.000839	0.040391

	component	fug_l	fug_g	Kj	ε
0	C_1	1.590653	0.871029	1.826176	0.008273
1	n-C_4	0.087392	0.282731	0.309099	0.241528
2	n-C_{10}	0.000839	0.040391	0.020772	0.020666
∑ε					0.020666

ε: 0.0206 is less than tolerance 0.096

Most Recent Calculated values

	component	name	zj	tc	pc	w	k	tr	b	ac	alpha	aT
0	C_1	Methane	0.5523	343.0	666.4	0.0104	2.000	1.8066	0.4298	9297.3418	0.7492	6966.5686
1	n-C_4	n-Butane	0.3630	765.3	550.6	0.1995	0.190	0.8097	1.1605	56018.6661	1.1391	63810.8626
2	n-C_{10}	n-Decane	0.0838	1111.7	305.2	0.4894	0.018	0.5574	3.0413	213253.5287	1.6124	343849.9897

Loops: 1

Experimental results

component	name	xj	yj
C_1	Methane	0.485	0.8260
n-C_4	n-Butane	0.412	0.1670
n-C_{10}	n-Decane	0.103	0.0063

Fig 2: Composition of mixture

Predicting the saturation pressure of a mixture

Feeds: Feed_1_PC_1

psia (ass.): 700

Alpha fxn: normal

	temp	Pbm	swell	visco
0	529.11	96.44	1.304	31.6

	component	name	xj	tc	pc	w	Mw
0	C_3	Propane	0.5794	665.73	616.00	0.1522	49.097
1	H_O	HeavyOil	0.4206	1625.76	233.91	0.8537	389.000

	component	name	xj	tc	pc	w	Mw	k	yj
0	C_3	Propane	0.5794	665.73	616.00	0.1522	49.097	1.780943e-01	1.031878e-01
1	H_O	HeavyOil	0.4206	1625.76	233.91	0.8537	389.000	3.661853e-10	1.540175e-10

	component	name	xj	tc	pc	w	Mw	k	yj	tr	b	ac	alpha	aT
0	C_3	Propane	0.5794	665.73	616.00	0.1522	49.097	1.725411e+00	9.997029e-01	0.79478	0.9024	37890.0	1.1352	43013.0
1	H_O	HeavyOil	0.4206	1625.76	233.91	0.8537	389.000	6.937485e-11	2.917906e-11	0.32545	5.8032	595072.0	2.6959	1604255.0

	aT	b	A	B
liquid	426270.115447	2.983676	0.990178	0.039092
gas	42987.445409	0.902132	0.099855	0.011899

	aT	b	A	B	z
liquid	426270.115447	2.983676	0.990178	0.039092	0.042757
gas	42987.445409	0.902132	0.099855	0.011899	0.905885

	component	liquid		gas	
		Aj	Bj	Aj	Bj
0	C_3	0.63531	0.304487	2.000582	1.000297
1	H_O	3.87993	1.968108	12.21784	6.432762

	component	fug_coef_l	fug_coef_g
0	C_3	1.575455e+00	0.913090
1	H_O	2.257137e-11	0.325354

Final Results from most recent iteration

	component	xj	yj	k	fug_coef_l	fug_coef_g	fug_l	fug_g	ε
0	C_3	0.5794	9.997029e-01	1.725411e+00	1.575455e+00	0.913090	6.837013e+01	6.837013e+01	1.751968e-21
1	H_O	0.4206	2.917906e-11	6.937485e-11	2.257137e-11	0.325354	7.110647e-10	7.110641e-10	5.383192e-13

	0
Final Pressure	74.9

Loops: 8

Fig 3: Normal alpha function with heavy oil as one PC

Predicting the saturation pressure of a mixture

Feeds: Feed_1_PC_1

psia (ass.): 100

Alpha fxn: Modified

	temp	Pbm	swell	visco
0	529.11	98.44	1.304	31.6

	component	name	xj	tc	pc	w	Mw
0	C_3	Propane	0.5794	665.73	616.00	0.1522	49.097
1	H_O	HeavyOil	0.4206	1625.76	233.91	0.8537	389.000

	component	name	xj	tc	pc	w	Mw	k	yj
0	C_3	Propane	0.5794	665.73	616.00	0.1522	49.097	1.246860e+00	7.223147e-01
1	H_O	HeavyOil	0.4206	1625.76	233.91	0.8537	389.000	2.563297e-09	1.078123e-09

	component	name	xj	tc	pc	w	Mw	k	yj	tr	b	ac	alpha	aT
0	C_3	Propane	0.5794	665.73	616.00	0.1522	49.097	1.000003	0.579402	0.79478	0.9024	37890.0	1.0279	38947.0
1	H_O	HeavyOil	0.4206	1625.76	233.91	0.8537	389.000	0.999996	0.420598	0.32545	5.8032	595072.0	0.1202	71528.0

	aT	b	A	B
liquid	51453.139810	2.963676	0.156541	0.0512
gas	51453.088243	2.963669	0.156541	0.0512

	aT	b	A	B	z
liquid	51453.139810	2.963676	0.156541	0.0512	0.904047
gas	51453.088243	2.963669	0.156541	0.0512	0.904047

	component	liquid		gas	
		Aj	Bj	Aj	Bj
0	C_3	1.74005	0.304487	1.740051	0.304487
1	H_O	2.358093	1.958108	2.358094	1.958114

	component	fug_coef_l	fug_coef_g
0	C_3	0.899654	0.899654
1	H_O	0.909933	0.909933

Final Results from most recent iteration

	component	xj	yj	k	fug_coef_l	fug_coef_g	fug_l	fug_g	ε
0	C_3	0.5794	0.579402	1.000003	0.899654	0.899654	51.135533	51.135676	7.724732e-12
1	H_O	0.4206	0.420598	0.999996	0.909933	0.909933	37.544637	37.544493	1.469382e-11

	0
Final Pressure	98.1

Loops: 4

Fig 4: Modified alpha function with heavy oil as one PC

Saturation pressure calculation

Equilibrium Properties at 109.088 psia and 69.260 deg F
Phase Split: Liquid-Vapour

Peng-Robinson Equations of State

	mole percent		
component	Feed	Phase01	Phase02
C3H8	57.94000	57.94000	100.00000
Heavy_oi	42.06000	42.06000	0.00000
Phase Mole %		100.00000	0.00000

	mass percent		
C3H8	13.50675	13.50675	100.00000
Heavy_oi	86.49325	86.49325	0.00000
Phase Mass %		100.00000	0.00000

	volume percent		
C3H8		18.74901	100.00000
Heavy_oi		81.25099	0.00000
Phase Volume %		100.00000	0.00000

component	ln (fug, atm)	K-values w.r.t. phase 1	
		Phase01/02	Phase02
C3H8	1.86974E+00	5.79400E-01	1.72592E+00
Heavy_oi	-3.04384E+01	6.41465E+12	1.55893E-13

		liquid	vapour
Z-factor		0.0790	0.8573
Molar vol, m3/kmol	0.25674	0.25674	2.78497
MW, g/mol	189.163	189.16	44.10
Ideal H,BTU/lbmol	17159.471	17159.47	6216.22
Enthalpy,BTU/lbmol	-11757.412	-11757.41	5802.90
Ideal Cp, BTU/lbmol-R		64.2601	17.5007
Cp, BTU/lbmol-R		81.9454	18.9911
Ideal S, BTU/lbmol-R		66.1937	64.3313
Entropy, BTU/lbmol-R		37.4434	63.8178
Density, lb/ft3		45.9969	0.9885
Viscosity, cp		2.224E-01	8.767E-03
IFT (Ref: Liquid), dyne/cm			10.0294
Phase Volume %		100.0000	0.0000

Fig 5: Winprop results with one PC

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Run Code

```
    for i in range(len(new_feed['mixture'])):
        for j in range(len(new_feed['mixture'])):
            new_feed['bip_matrix'][i][j] = 0

    return new_feed

created_feed = create_a_new_feed_from_pcs(feeds['Feed_1_PC_1'], final_PC_properties)
feeds[f"Feed_1_PC_{number_of_intended_pcs}"] = created_feed
```

Lumping to 5 pseudocomponents

	component	Mw	zi	SG	zlnM	PC	z'
0	C8	108	0.046304	0.781433	0.216802	1	0.177989
1	C9	122	0.031843	0.798716	0.152973	1	0.122401
2	C10	136	0.037450	0.814441	0.183981	1	0.143967
3	C11	150	0.046821	0.828889	0.234605	1	0.179978
4	C12	164	0.045317	0.842270	0.231109	1	0.174184
...	...	...	...	...	...	...	...
105	C113	1578	0.000093	1.264496	0.000683	5	0.000881
106	C114	1592	0.000087	1.266502	0.000644	5	0.000810
107	C115	1606	0.000082	1.268494	0.000606	5	0.000762
108	C116	1620	0.000077	1.270471	0.000571	5	0.000717
109	C117	1634	0.000073	1.272436	0.000537	5	0.000674

110 rows × 7 columns

	component	range	name	zi	Mw	SG	Tb°R	tc	pc	w
0	PC_1	C8 - C13	Pseudo_1	0.260150	145.162007	0.825816	828.587262	1443.421388	241.511244	0.058120
1	PC_2	C14 - C18	Pseudo_2	0.224494	218.089600	0.887008	1006.913573	1593.252540	154.658016	0.045236
2	PC_3	C19 - C26	Pseudo_3	0.200232	304.139973	0.941769	1157.789364	1724.849836	108.909084	0.040411
3	PC_4	C27 - C43	Pseudo_4	0.187737	467.018186	1.017896	1341.165408	1896.674657	74.852022	0.039768
4	PC_5	C44 - C117	Pseudo_5	0.107780	818.206225	1.128455	1529.979413	2108.892485	58.401447	0.042455

Fig 6: Lumping results

Predicting the saturation pressure of a mixture

Feeds: Feed_1_PC_5

psia (ass.): 100

Alpha fun: normal

	temp	Pbm	swell	visco
0	529.11	98.44	1.304	31.6

	component	name	xj	tc	pc	w	Mw
0	C_4	Propane	0.579400	666.730000	616.000000	0.152200	49.097000
1	PC_1	Pseudo_1	0.109419	1443.421366	241.511244	0.058120	145.162007
2	PC_2	Pseudo_2	0.094422	1593.252540	154.558016	0.045236	218.089800
3	PC_3	Pseudo_3	0.084218	1724.849836	108.909084	0.040411	304.139973
4	PC_4	Pseudo_4	0.078962	1896.674857	74.852022	0.039788	467.018186
5	PC_5	Pseudo_5	0.046332	2108.892486	58.401447	0.042455	818.206225

	component	name	xj	tc	pc	w	Mw	k	yj
0	C_4	Propane	0.579400	666.730000	616.000000	0.152200	49.097000	1.248660e+00	7.223147e-01
1	PC_1	Pseudo_1	0.109419	1443.421366	241.511244	0.058120	145.162007	1.314312e-04	1.438110e-05
2	PC_2	Pseudo_2	0.094422	1593.252540	154.558016	0.045236	218.089800	1.935384e-05	1.827432e-06
3	PC_3	Pseudo_3	0.084218	1724.849836	108.909084	0.040411	304.139973	3.577734e-06	3.013064e-07
4	PC_4	Pseudo_4	0.078962	1896.674857	74.852022	0.039788	467.018186	4.042543e-07	3.192150e-08
5	PC_5	Pseudo_5	0.046332	2108.892486	58.401447	0.042455	818.206225	3.217975e-08	1.456781e-09

	component	name	xj	tc	pc	w	Mw	k	yj	tr	b	ac	alpha	aT
0	C_4	Propane	0.579400	666.730000	616.000000	0.152200	49.097000	1.728492	1.000329e+00	0.79478	0.9024	37890.0	1.1352	43013.0
1	PC_1	Pseudo_1	0.109419	1443.421366	241.511244	0.058120	145.162007	0.000782	8.558191e-05	0.38657	4.9902	454312.0	1.3991	635628.0
2	PC_2	Pseudo_2	0.094422	1593.252540	154.558016	0.045236	218.089800	0.000072	6.772417e-06	0.33209	8.5015	864375.0	1.4115	1220065.0
3	PC_3	Pseudo_3	0.084218	1724.849836	108.909084	0.040411	304.139973	0.000013	1.082925e-06	0.30676	13.2235	1438813.0	1.4274	2053476.0
4	PC_4	Pseudo_4	0.078962	1896.674857	74.852022	0.039788	467.018186	0.000003	2.707842e-07	0.27897	21.1568	2539975.0	1.4532	3878013.0
5	PC_5	Pseudo_5	0.046332	2108.892486	58.401447	0.042455	818.206225	0.000001	5.868780e-08	0.25089	30.1503	4010429.0	1.4870	5963508.0

	aT	b	A	B
liquid	482364.097038	0.032063	1.340358	0.096180
gas	43073.677827	0.903204	0.119692	0.014252

	aT	b	A	B	z
liquid	482364.097038	0.032063	1.340358	0.096180	0.113927
gas	43073.677827	0.903204	0.119692	0.014252	0.885383

	component	liquid		gas	
		Aj	Bj	Aj	Bj
0	C_4	0.597235	0.149601	1.998578	0.999109
1	PC_1	2.295875	0.827279	7.682881	5.524996
2	PC_2	3.180814	1.425983	10.644228	9.523315
3	PC_3	4.128693	2.192202	13.809187	14.640851
4	PC_4	5.522726	3.50739	18.481182	23.424156
5	PC_5	7.032305	4.99834	23.532797	33.381482

	component	fug_coef_l	fug_coef_g
0	C_4	1.547347e+00	0.896238
1	PC_1	3.576154e-04	0.457223
2	PC_2	2.380387e-05	0.331878
3	PC_3	3.077597e-06	0.239340
4	PC_4	5.182019e-07	0.151110
5	PC_5	1.199948e-07	0.092888

Final Results from most recent iteration

	component	xj	yj	k	fug_coef_l	fug_coef_g	fug_l	fug_g	c
0	C_4	0.579400	1.000329e+00	1.728492	1.547347e+00	0.896238	8.032936e+01	8.032936e+01	3.187077e-28
1	PC_1	0.109419	8.558191e-05	0.000782	3.576154e-04	0.457223	3.508049e-03	3.508049e-03	5.037331e-19
2	PC_2	0.094422	6.772417e-06	0.000072	2.380387e-05	0.331878	2.013882e-04	2.013882e-04	1.138827e-18
3	PC_3	0.084218	1.082925e-06	0.000013	3.077597e-06	0.239340	2.322324e-05	2.322324e-05	2.074552e-18
4	PC_4	0.078962	2.707842e-07	0.000003	5.182019e-07	0.151110	3.668274e-06	3.668274e-06	3.930553e-18
5	PC_5	0.046332	5.868780e-08	0.000001	1.199948e-07	0.092888	4.873912e-07	4.873912e-07	5.579771e-18

	0
Final Pressure	89.6

Loops: 6

Fig 7: Five (5) PCs with normal alpha function

Predicting the saturation pressure of a mixture

Feeds: Feed_1_PC_5

psia (ass.): 100

Alpha fxn: Modified

	temp	Pbm	swell	visco
0	529.11	96.44	1.304	31.6

	component	name	xj	tc	pc	w	Mw
0	C_4	Propane	0.579400	665.730000	616.000000	0.152200	49.097000
1	PC_1	Pseudo_1	0.109419	1443.421366	241.511244	0.068120	145.162007
2	PC_2	Pseudo_2	0.094422	1593.252540	154.658016	0.045236	218.089800
3	PC_3	Pseudo_3	0.084218	1724.849836	108.909084	0.040411	304.139973
4	PC_4	Pseudo_4	0.078962	1896.674857	74.852022	0.039768	467.018186
5	PC_5	Pseudo_5	0.045332	2108.892486	58.401447	0.042456	818.206225

	component	name	xj	tc	pc	w	Mw	k	yj
0	C_4	Propane	0.579400	665.730000	616.000000	0.152200	49.097000	1.246660e+00	7.223147e-01
1	PC_1	Pseudo_1	0.109419	1443.421366	241.511244	0.068120	145.162007	1.314312e-04	1.438110e-05
2	PC_2	Pseudo_2	0.094422	1593.252540	154.658016	0.045236	218.089800	1.935384e-05	1.827432e-06
3	PC_3	Pseudo_3	0.084218	1724.849836	108.909084	0.040411	304.139973	3.577734e-06	3.013084e-07
4	PC_4	Pseudo_4	0.078962	1896.674857	74.852022	0.039768	467.018186	4.042643e-07	3.192150e-08
5	PC_5	Pseudo_5	0.045332	2108.892486	58.401447	0.042456	818.206225	3.217975e-08	1.458781e-09

	component	name	xj	tc	pc	w	Mw	k	yj	tr	b	ac	alpha	aT
0	C_4	Propane	0.579400	665.730000	616.000000	0.152200	49.097000	1.725178	9.995684e-01	0.79478	0.9024	37890.0	1.0279	38947.0
1	PC_1	Pseudo_1	0.109419	1443.421366	241.511244	0.068120	145.162007	0.002710	2.964810e-04	0.36657	4.9902	464312.0	1.2310	571558.0
2	PC_2	Pseudo_2	0.094422	1593.252540	154.658016	0.045236	218.089800	0.000300	2.832023e-05	0.33209	8.6015	864375.0	1.2582	1096200.0
3	PC_3	Pseudo_3	0.084218	1724.849836	108.909084	0.040411	304.139973	0.000083	5.335740e-06	0.30678	13.2235	1438813.0	1.2903	1856242.0
4	PC_4	Pseudo_4	0.078962	1896.674857	74.852022	0.039768	467.018186	0.000021	1.687714e-06	0.27897	21.1588	2530975.0	1.3078	3310009.0
5	PC_5	Pseudo_5	0.045332	2108.892486	58.401447	0.042456	818.206225	0.000012	5.596079e-07	0.25089	30.1503	4010429.0	1.3200	5293786.0

	aT	b	A	B
liquid	432613.350553	6.032063	1.579149	0.125030
gas	39017.218675	0.903867	0.142423	0.018736

	aT	b	A	B	z
liquid	432613.350553	6.032063	1.579149	0.125030	0.153535
gas	39017.218675	0.903867	0.142423	0.018736	0.854122

	component	liquid		gas	
		Aj	Bj	Aj	Bj
0	C_4	0.600092	0.149601	1.995205	0.998388
1	PC_1	2.273978	0.827279	7.571967	5.521008
2	PC_2	3.183649	1.425963	10.601017	9.516441
3	PC_3	4.142834	2.192202	13.794943	14.630084
4	PC_4	5.532161	3.50739	18.421188	23.407249
5	PC_5	6.996206	4.99834	23.295193	33.357387

	component	fug_coef_l	fug_coef_g
0	C_4	1.516329e+00	0.878941
1	PC_1	1.087205e-03	0.401244
2	PC_2	8.173001e-05	0.272496
3	PC_3	1.174695e-05	0.185411
4	PC_4	2.349461e-06	0.109923
5	PC_5	7.962813e-07	0.064506

Final Results from most recent iteration

	component	xj	yj	k	fug_coef_l	fug_coef_g	fug_l	fug_g	c
0	C_4	0.579400	9.995684e-01	1.725178	1.516329e+00	0.878941	103.406666	103.406666	8.554639e-20
1	PC_1	0.109419	2.964810e-04	0.002710	1.087205e-03	0.401244	0.014002	0.014002	8.340640e-13
2	PC_2	0.094422	2.832023e-05	0.000300	8.173001e-05	0.272496	0.000908	0.000908	1.924823e-12
3	PC_3	0.084218	5.335740e-06	0.000063	1.174695e-05	0.185411	0.000116	0.000116	3.512801e-12
4	PC_4	0.078962	1.687714e-06	0.000021	2.349461e-06	0.109923	0.000022	0.000022	6.550443e-12
5	PC_5	0.045332	5.596079e-07	0.000012	7.962813e-07	0.064506	0.000004	0.000004	1.070093e-11

	0
Final Pressure	117.7

Loops: 8

Fig 8: Five (5) PCs with modified alpha function

Equilibrium Properties at 93.604 psia and 69.260 deg F
Phase Split: Liquid-Vapour

Peng-Robinson Equations of State

component	Feed	Phase01	Phase02
		mole percent	
C3H8	58.42180	58.42180	99.99722
PC1	11.03289	11.03289	0.00277
PC2	9.52072	9.52072	0.00001
PC3	8.49183	8.49183	0.00000
PC4	7.96186	7.96186	0.00000
PC5	4.57090	4.57090	0.00000
Phase Mole %		100.00000	0.00000
		mass percent	
C3H8	15.80979	15.80979	99.99084
PC1	9.82844	9.82844	0.00912
PC2	12.74228	12.74228	0.00004
PC3	15.84956	15.84956	0.00000
PC4	22.81868	22.81868	0.00000
PC5	22.95125	22.95125	0.00000
Phase Mass %		100.00000	0.00000
		volume percent	
C3H8		27.01388	99.99985
PC1		10.71128	0.00015
PC2		13.51375	0.00000
PC3		15.89607	0.00000
PC4		19.60616	0.00000
PC5		13.25886	0.00000
Phase Volume %		100.00000	0.00000

component	ln (fug, atm)	K-values w.r.t. phase 1	
		Phase01/02	Phase02
C3H8	1.73670E+00	5.84234E-01	1.71164E+00
PC1	-9.21615E+00	3.98215E+03	2.51121E-04
PC2	-1.52725E+01	1.07497E+06	9.30263E-07
PC3	-2.14193E+01	3.27525E+08	3.05320E-09
PC4	-2.99377E+01	1.00685E+12	9.93194E-13
PC5	-3.90907E+01	3.73263E+15	2.67907E-16

		liquid	vapour
Z-factor		0.0470	0.8798
Molar vol, m3/kmol	0.17811	0.17811	3.33063
MW, g/mol	162.951	162.95	44.10
Ideal H,BTU/lbmol	13486.045	13486.04	6216.35
Enthalpy,BTU/lbmol	-7316.047	-7316.05	5869.05
Ideal Cp, BTU/lbmol-R		52.0919	17.5016
Cp, BTU/lbmol-R		65.6574	18.6894
Ideal S, BTU/lbmol-R		46.7718	64.3296
Entropy, BTU/lbmol-R		23.2697	63.9011
Density, lb/ft3		57.1156	0.8266
Viscosity, cp		2.992E-01	8.718E-03
IFT (Ref: Liquid), dyne/cm			20.7793
Phase Volume %		100.0000	0.0000
Phase Mole %		100.0000	0.0000

Fig 9: Five(5) PCs using Winprop