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Thermodynamic data of water

280 K < T < 340 K
0 Pa < P < 50 Mpa

References : Wagner & Pruss (2002) IAPWS-95

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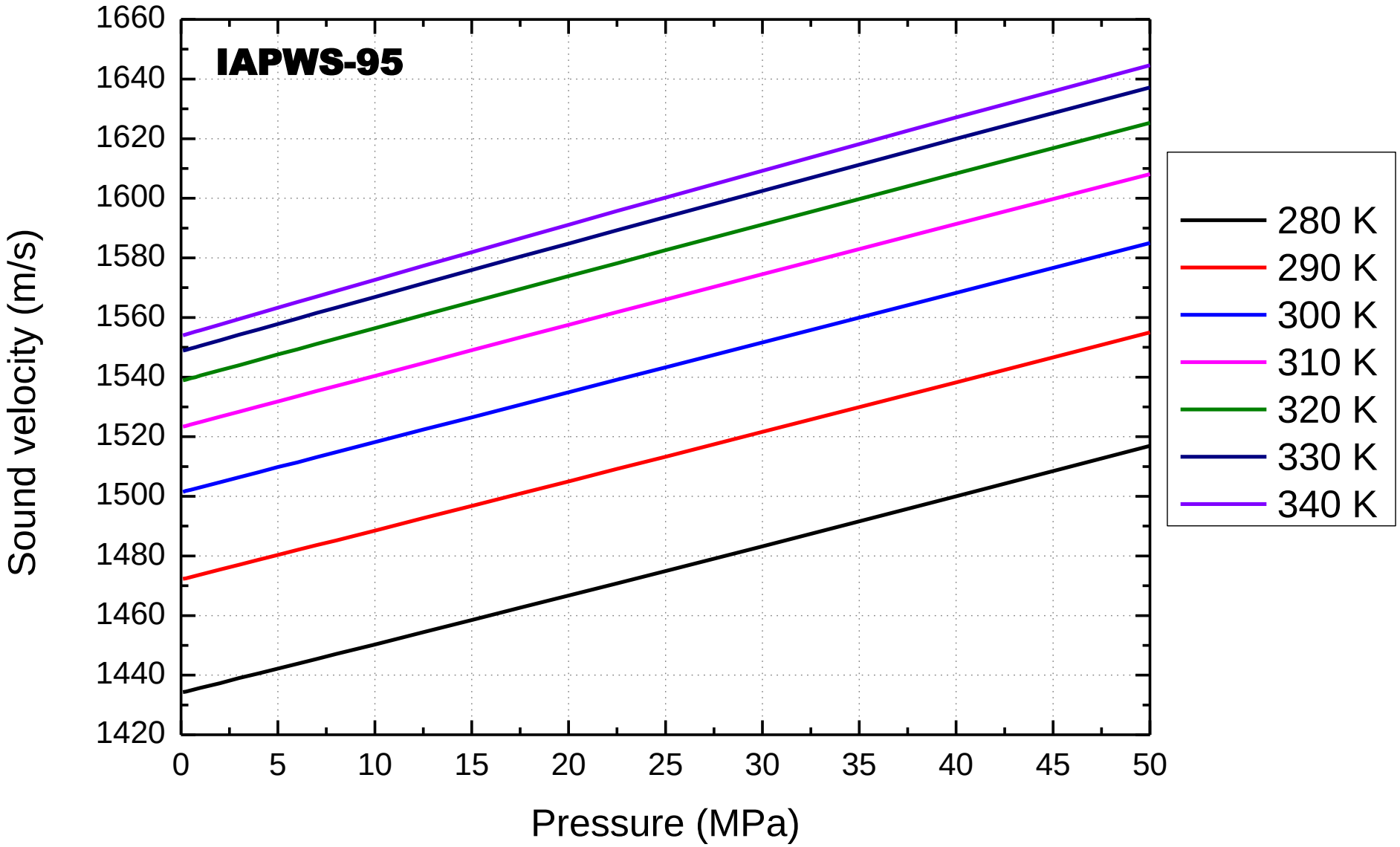
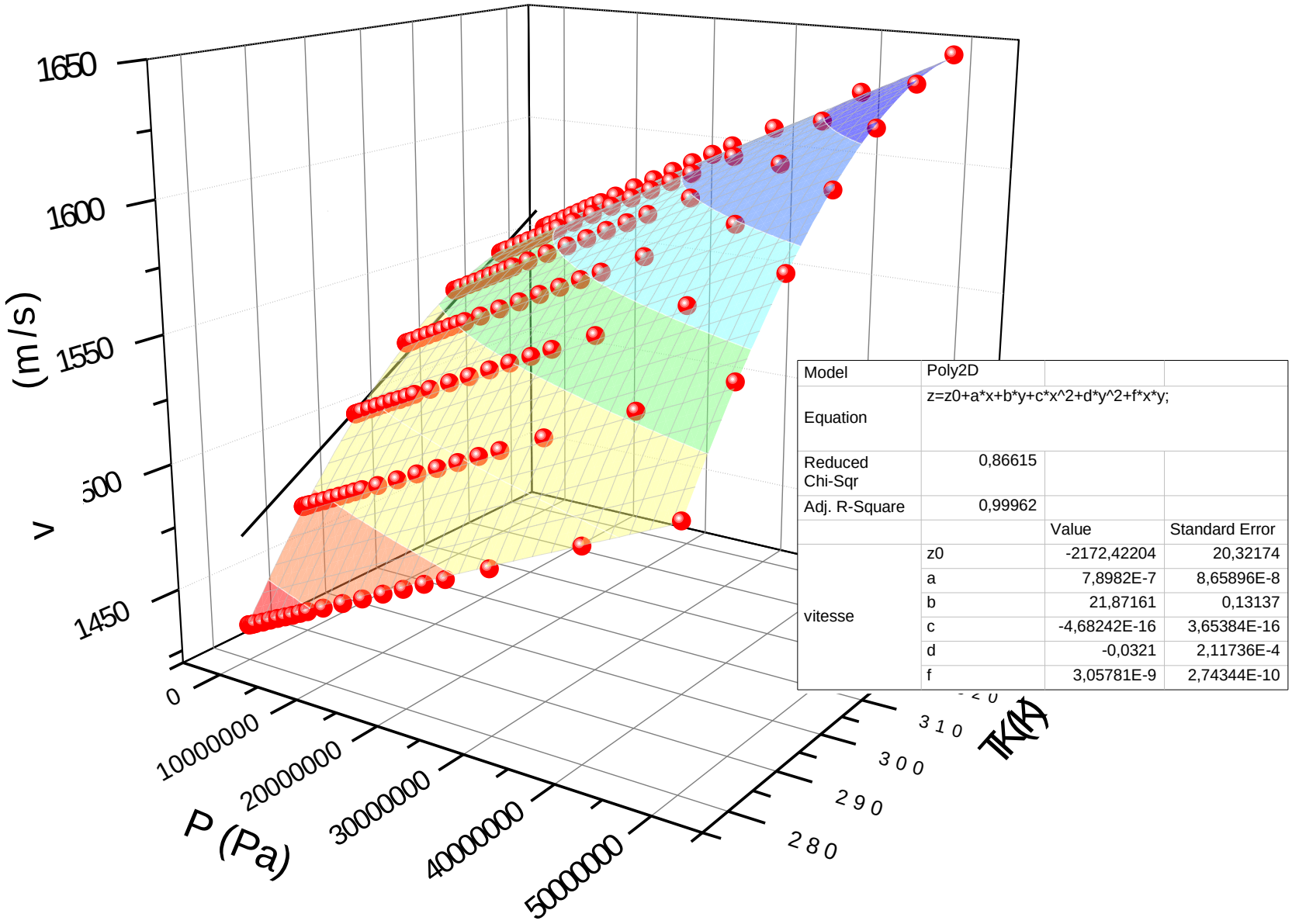
Sound velocity

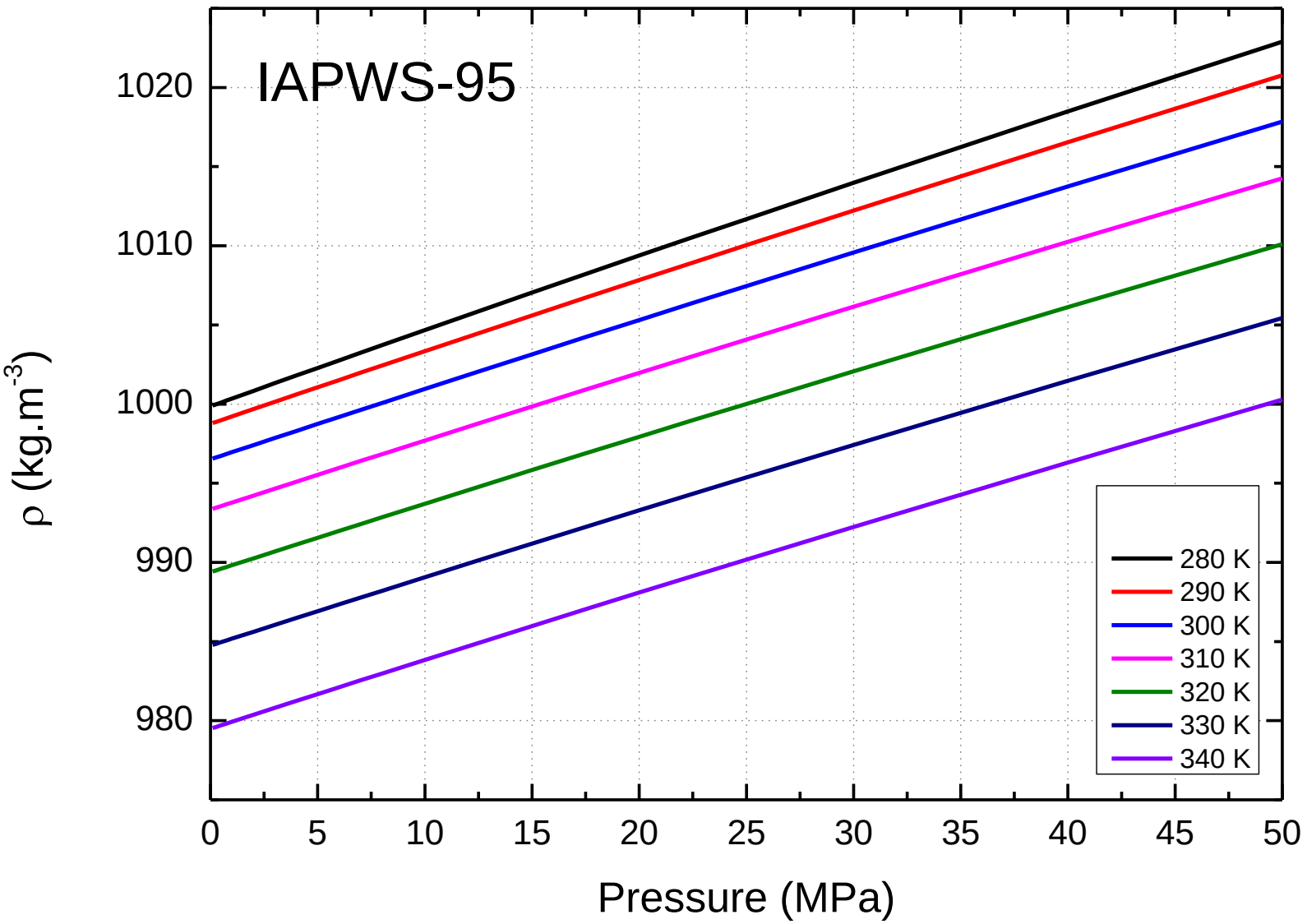


Polynomial representation of sound velocity (ORIGIN software)

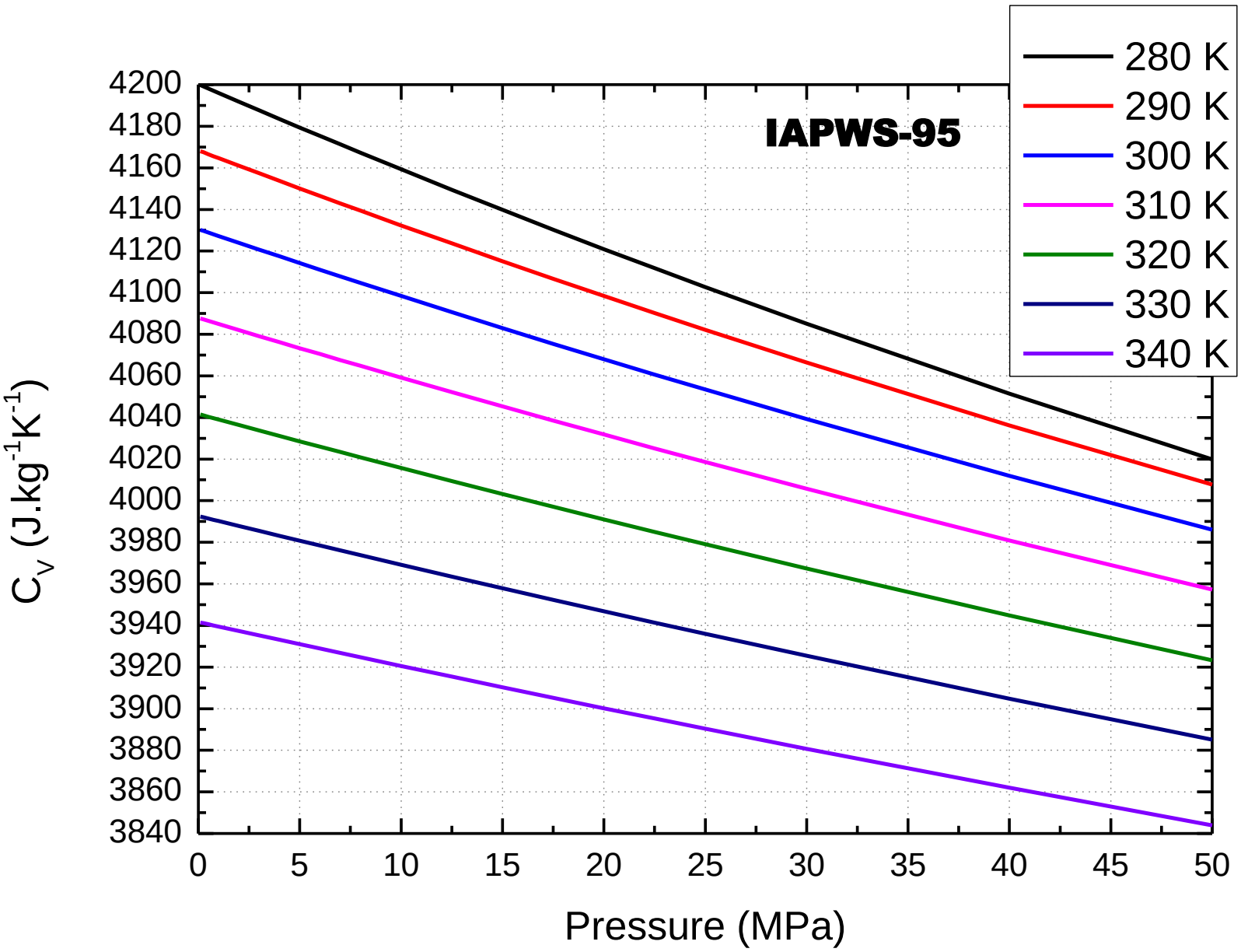


Model	Poly2D		
Equation	z=z0+a*x+b*y+c*x^2+d*y^2+f*x*y;		
Reduced Chi-Sqr	0,86615		
Adj. R-Square	0,99962		
		Value	Standard Error
vitesse	z0	-2172,42204	20,32174
	a	7,8982E-7	8,65896E-8
	b	21,87161	0,13137
	c	-4,68242E-16	3,65384E-16
	d	-0,0321	2,11736E-4
	f	3,05781E-9	2,74344E-10

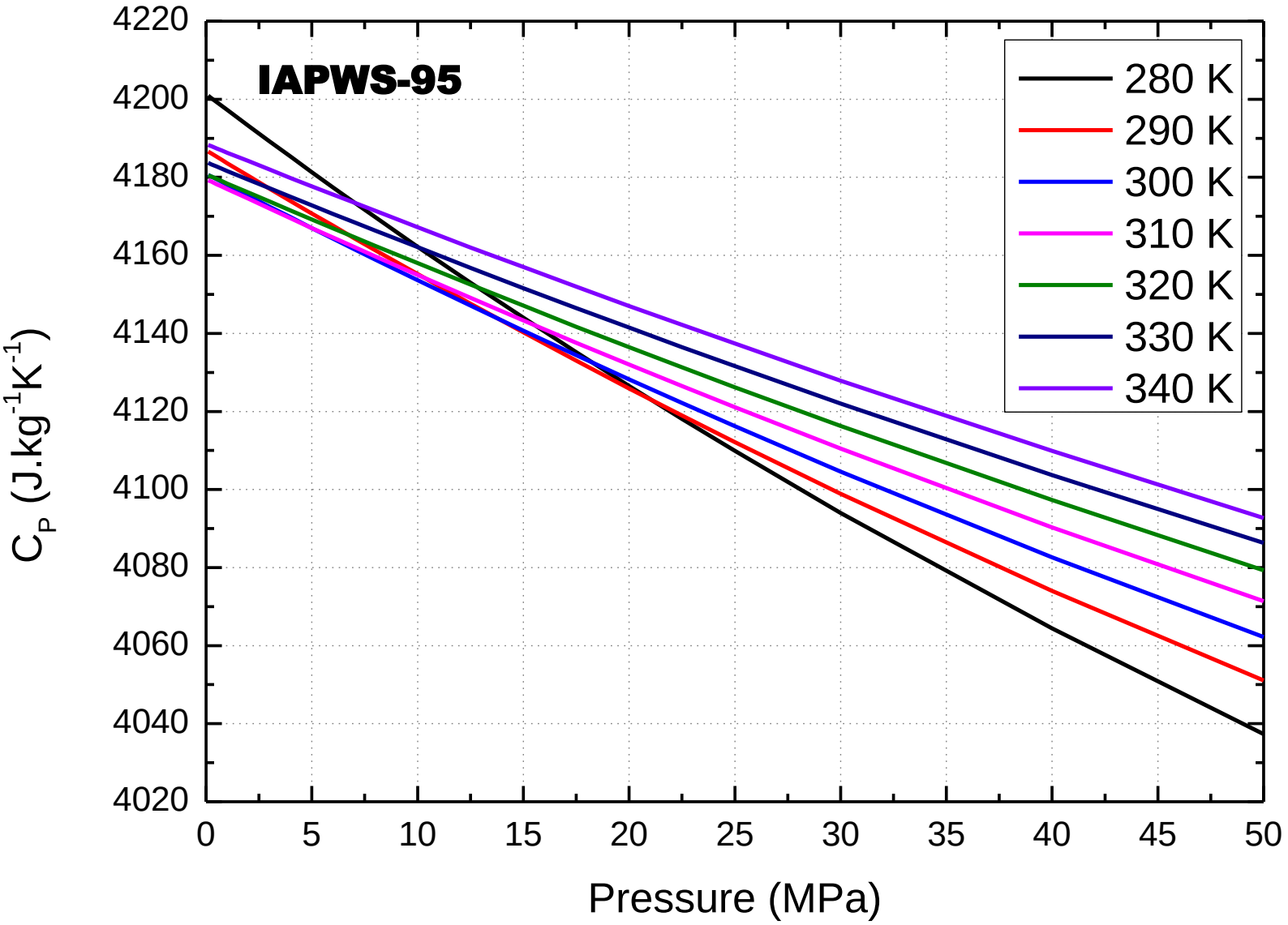
Density ρ


IAPWS-95
ρ (kg.m-3)
1020
1010
1000
990
980
0
5
10
15
20
25
30
35
40
45
50
Pressure (MPa)
280 K
290 K
300 K
310 K
320 K
330 K
340 K

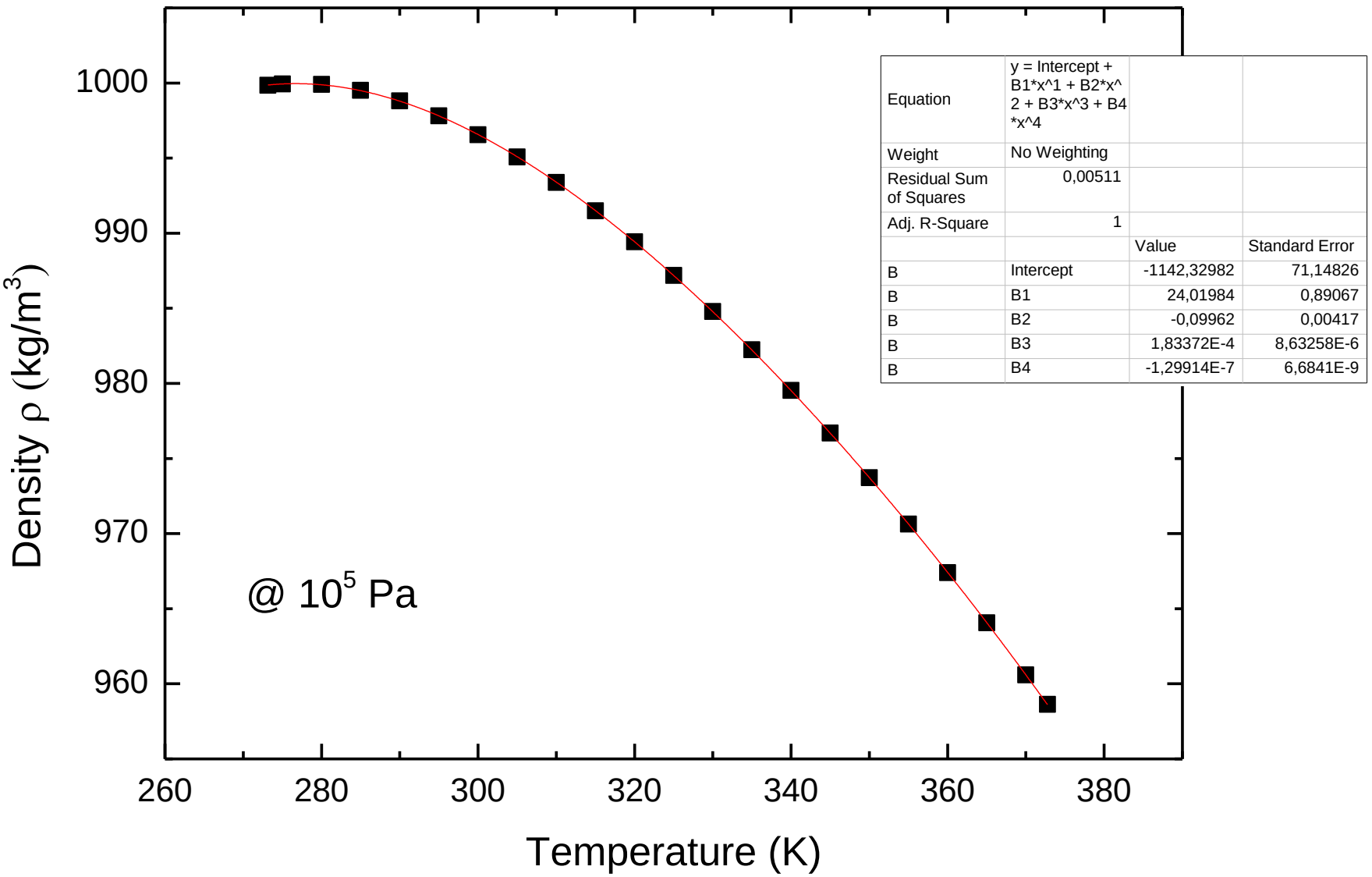
Heat capacity at constant volume C_v



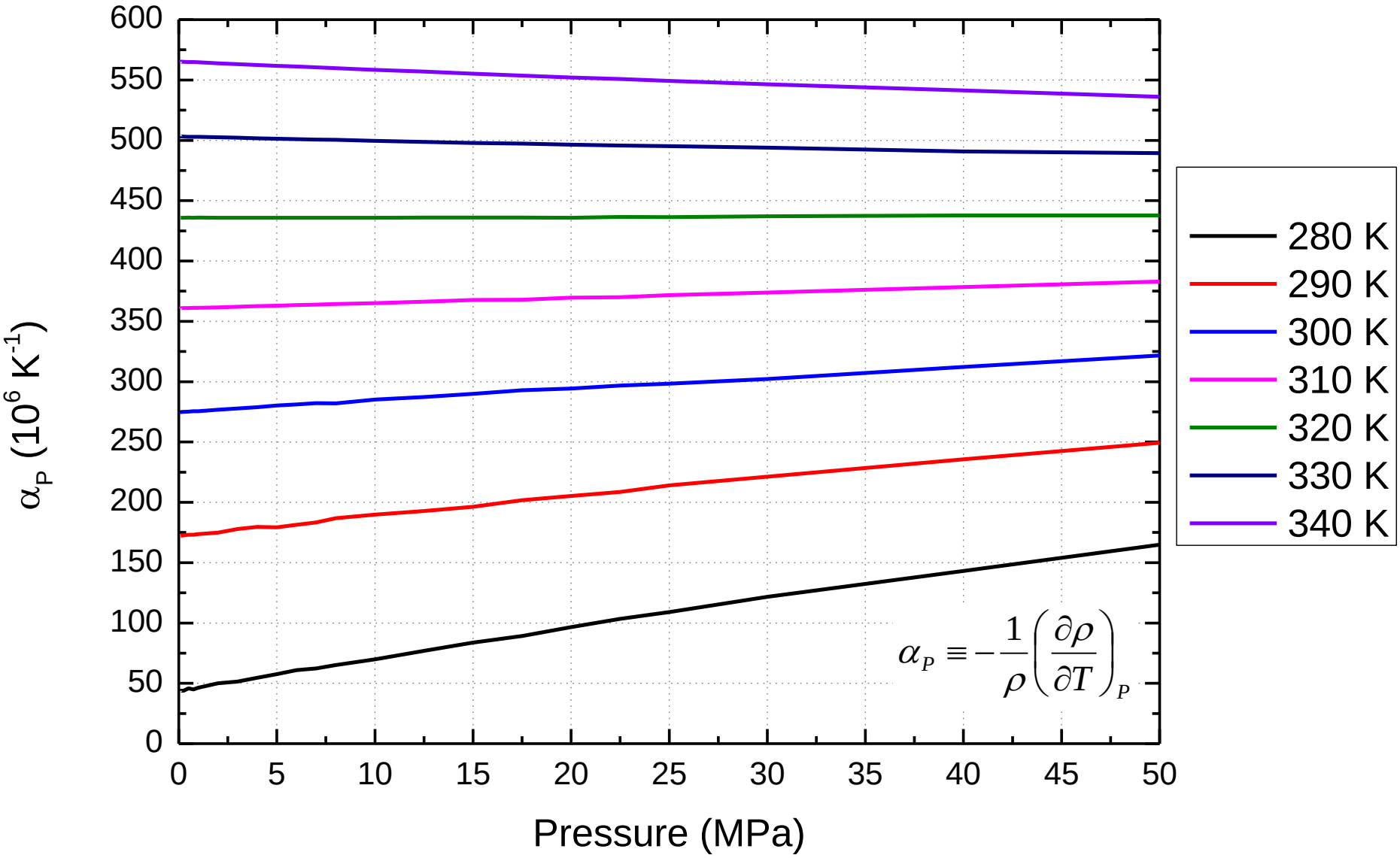
Heat capacity at constant pressure C_P



Polynomial representation of density at P_{atm} (ORIGIN software)

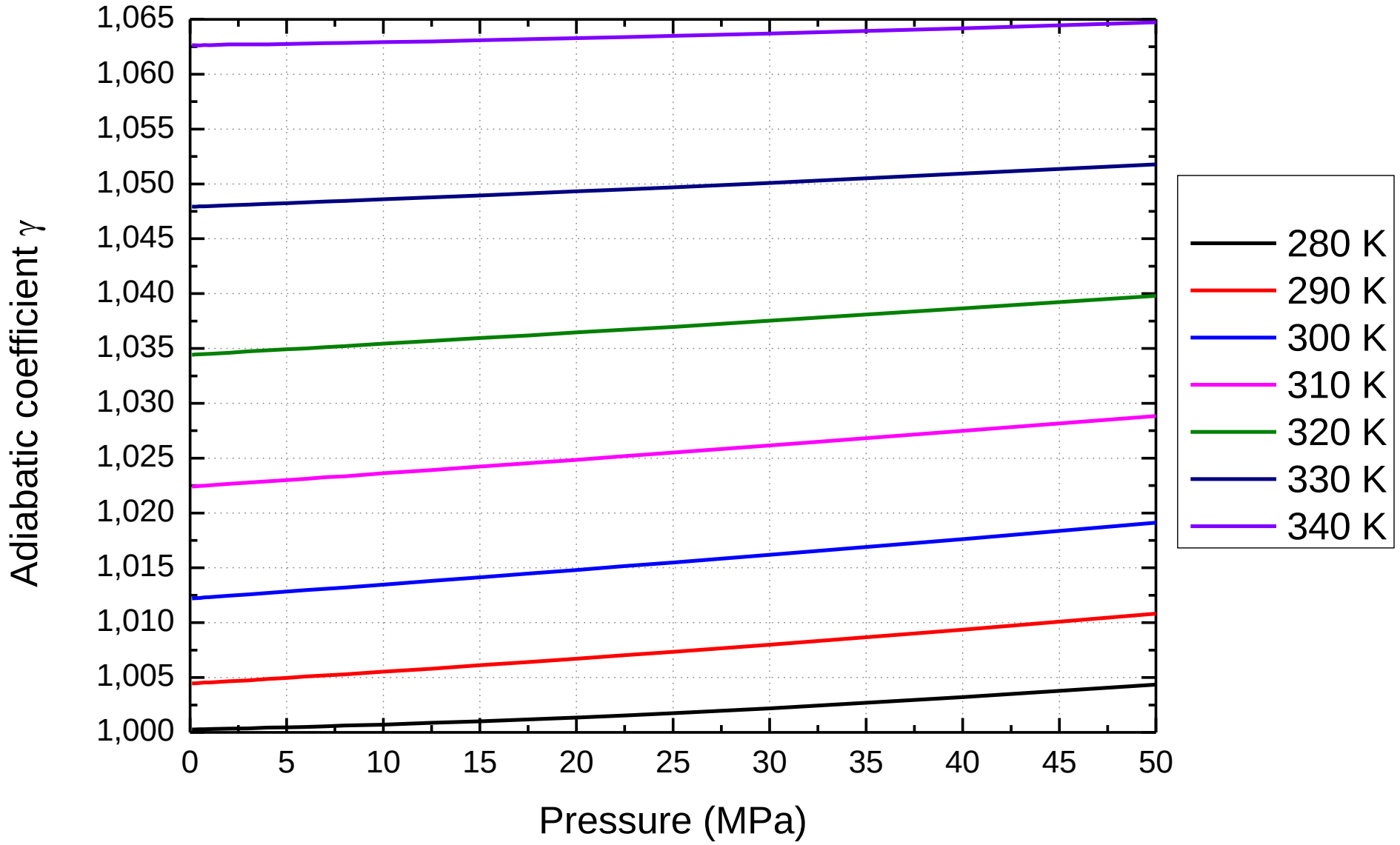


Thermal expansion coefficient α_P (calculation)

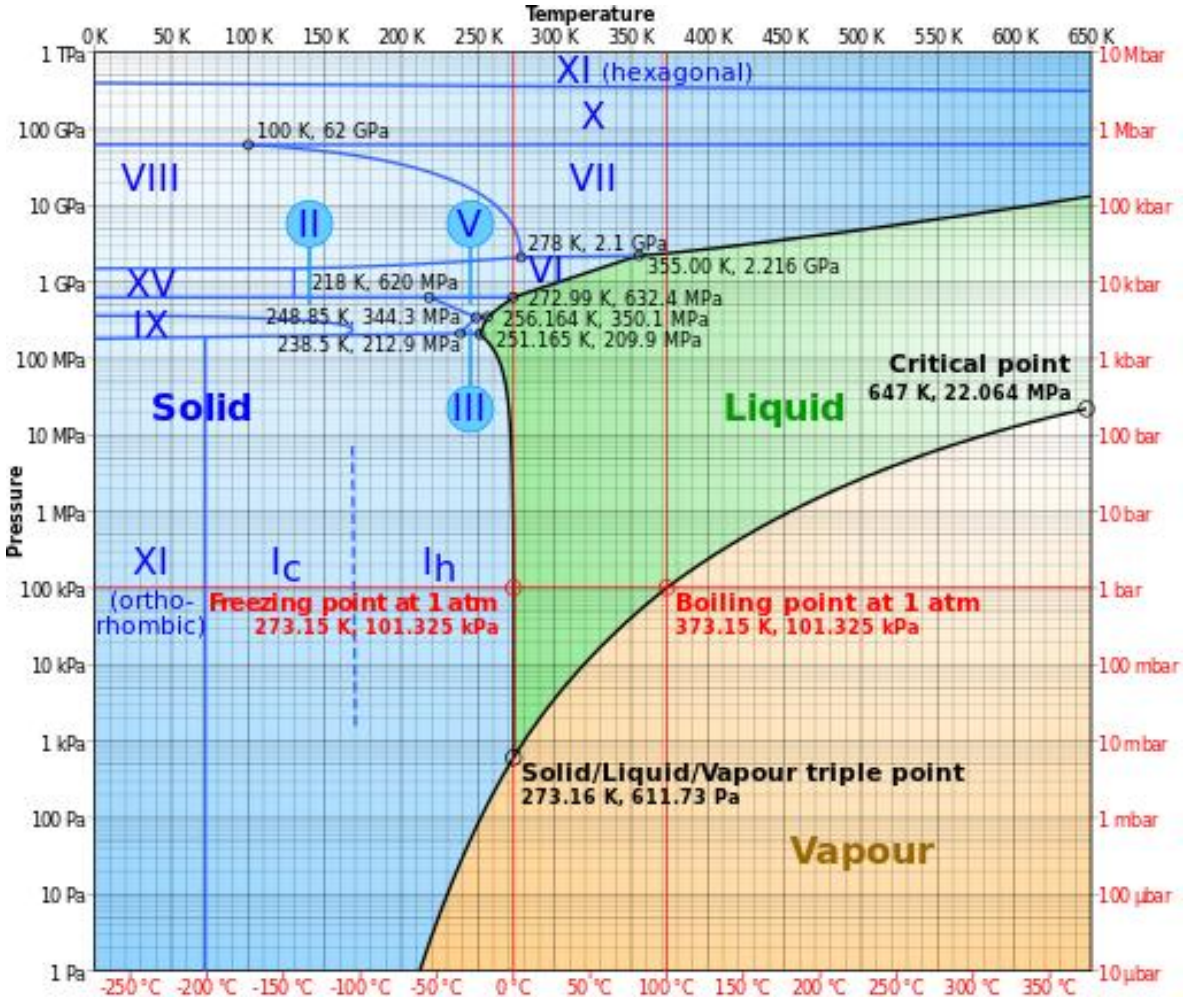


Adiabatic coefficient γ

$$\gamma \equiv \frac{C_P}{C_V}$$

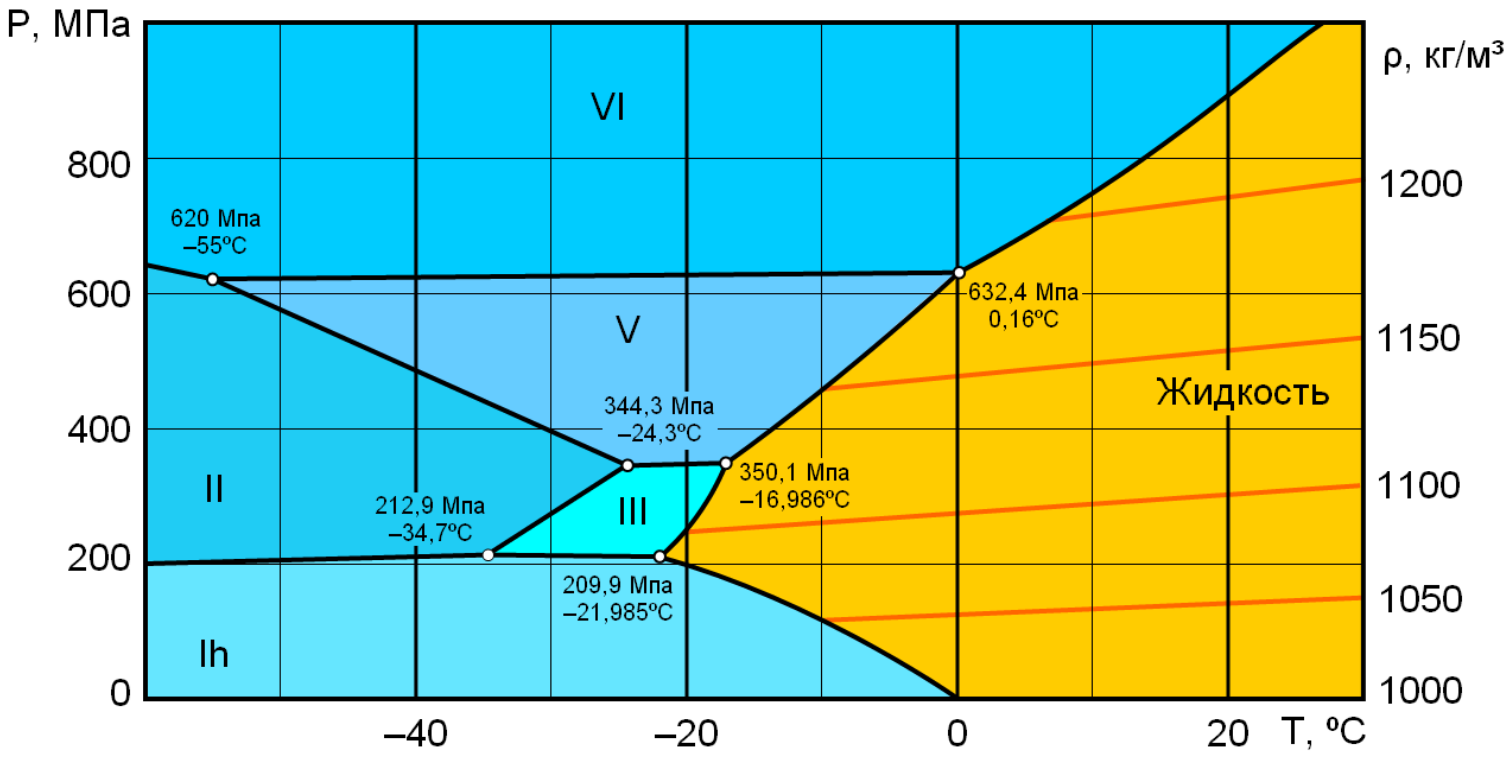


Phase diagram 1/3



http://en.wikipedia.org/wiki/Ice

Phase diagram 2/3



http://commons.wikimedia.org/wiki/File:Water_phase_diagram_2.gif

Phase diagram 3/3

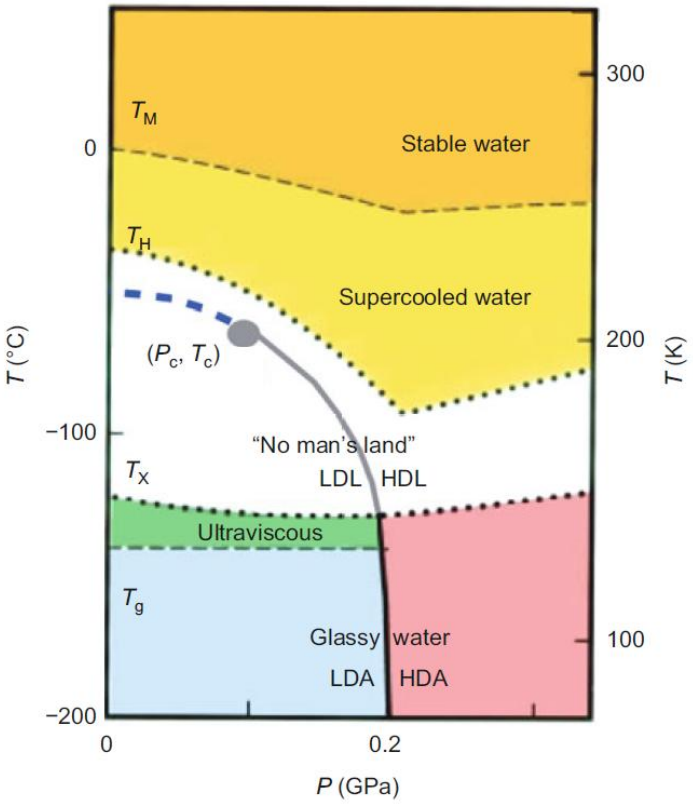


Figure 2 The phase diagram of water (adapted from ref. [25]). A first order LLPT line is shown between HDL and LDL. The LLPT ends with a LLCP at P_c, T_c. T_m , T_g and T_H represent the melting temperature, glass transition temperature, and homogeneous nucleation temperature, respectively.

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doi: 10.1007/s11433-014-5451-z

Mishima O, Stanley H E. Decompression-induced melting of ice IV and the liquid-liquid transition in water. Nature, 1998, 392: 164–168

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•*The IAPWS Formulation 1995 for the Thermodynamic Properties of Ordinary Water Substance for General and Scientific Use, Wagner, W. and Pruß, A., Journal of Physical and Chemical Reference Data,* ***31, 387-535 (2002), DOI:*** ***http://dx.doi.org/10.1063/1.1461829***

• Explanation of the Density Anomalies of Water (D1-D22) (Martin Chaplin) http://www1.lsbu.ac.uk/water/explan2.html