Process Systems Engineering

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Lab target: use of the computer and knowledge of the operating system. Use a spreadsheet to perform simple numerical evaluations.

- **Exercise # 1**

Compare an investment of € 10,000 after 7 years, which produces a gross interest of 34% less tax of 12.5% on the profits obtained with respect to depositing in the bank the same amount for the same period with an annual gross interest rate of 4.6 % with taxation on the profits of 27.5%.

- **Exercise # 2**

Compare the cost of a telephone call made by telephone operators A and B

A) 5.68E-4 €/s with VAT from 00.00 to 24.00

B) € 0.052 to answer plus VAT and €/min 0.014 plus VAT from 8 AM to 6:30 PM and €/min 0.0077 plus VAT from 6:30 PM to 8 AM.

- **Exercise # 3**

Determine the trend of the specific heat at constant pressure in the gas phase and the vapor pressure for the chemical species: SO_2 in the range 0, ... 100 °C

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Cp = A + B*T + C*T^2 + D*T^3  [J/mol/K]    when T in K
A = 2.385E1  B = 6.699E-2   C = -4.961E-5   D = 1.328E-8
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ln(Pv) = A - B/T + C*ln(T) + D*Pv/T^2   [bar]   when T in K
A = 48.882  B = 4552.50   C = -5.666    D = 990.
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- **Exercise # 4**

Compare the trends of the specific heat for the gas-phase species SO_2 using the formulas 1 or 2.

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Cp1 = A + B*T + C*T^2 + D*T^3  [J/mol/K]    when T in K
A = 2.385E1  B = 6.699E-2   C = -4.961E-5   D = 1.328E-8
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Cp2 = A + B*(C/T/SINH(C/T))^2 + D*(E/T/COSH(E/T))^2  [J/kmol/K]
when T in K
A =  3.3375E+04     B =  2.5864E+04     C =  9.3280E+02
D =  1.0880E+04     E =  4.2370E+02
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