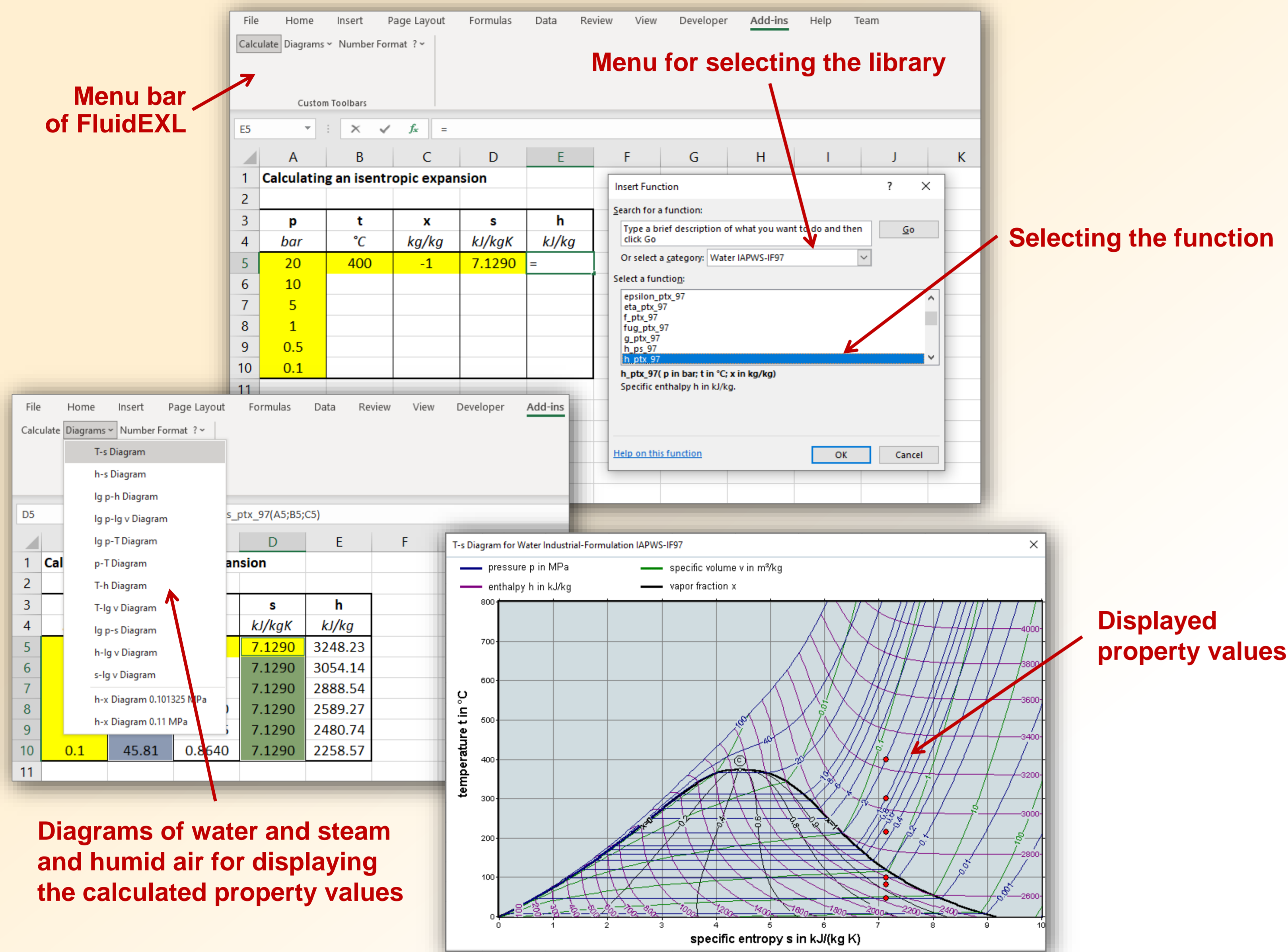


Property Calculation Libraries and Software for Working Fluids in Energy Conversion Processes

Hans-Joachim Kretschmar, Matthias Kunick, Sebastian Herrmann, Martin Suender

Add-Ons for Using the Property Libraries

FluidEXL^{Graphics} for Excel including VBA



Menu bar of FluidEXL

Menu for selecting the library

Selecting the function

Diagrams of water and steam and humid air for displaying the calculated property values

Displayed property values

Property Libraries

Steam, water and ice

LibIF97
LibIF97_META
LibICE

Seawater
Humid air

LibSeaWa
LibHuAir
LibHuAirProp

Humid combustion
gas mixtures

LibHuGas
LibIdGasMix

Carbon dioxide incl. dry ice
Hydrogen

LibCO2
LibH2

Ammonia/water mixtures
Water/lithium bromide
mixtures

LibAmWa
LibWaLi

Ammonia
R134a

LibNH3
LibR134a

Propane
Iso-butane
N-butane

LibPropane
LibButane_Iso
LibButane_n

Liquid coolants

LibSecRef

Ethanol

LibC2H5OH

Methanol

LibCH3OH

Siloxanes

LibD4 ...

as ORC working fluids

... LibMM

Helium

LibHe

Dry air

LibRealAir

Nitrogen and oxygen

LibN2, LibO2

Hydrocarbons

LibC5H10 ...

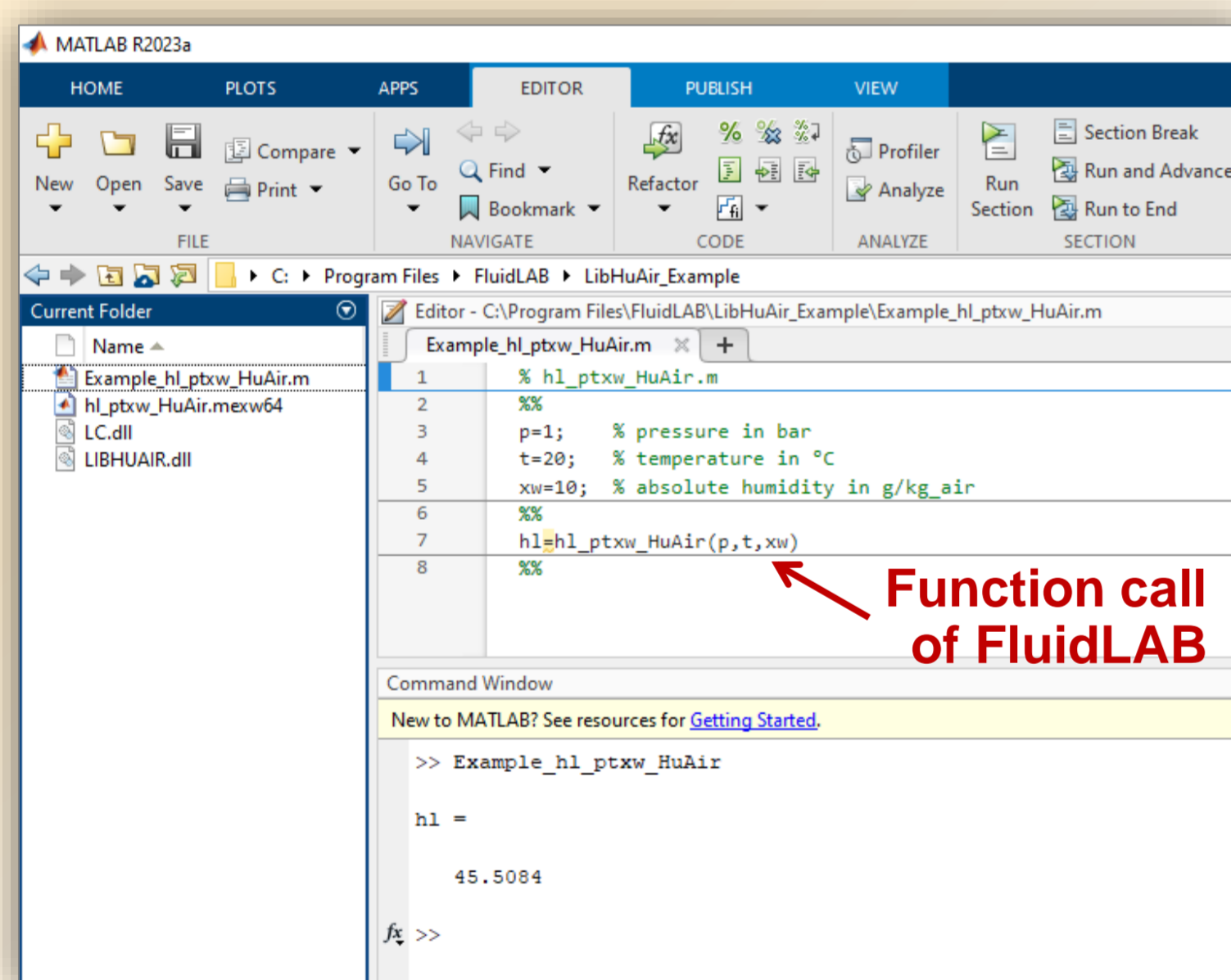
... LibC10H22

Other fluids

LibCO ...

... LibSO2

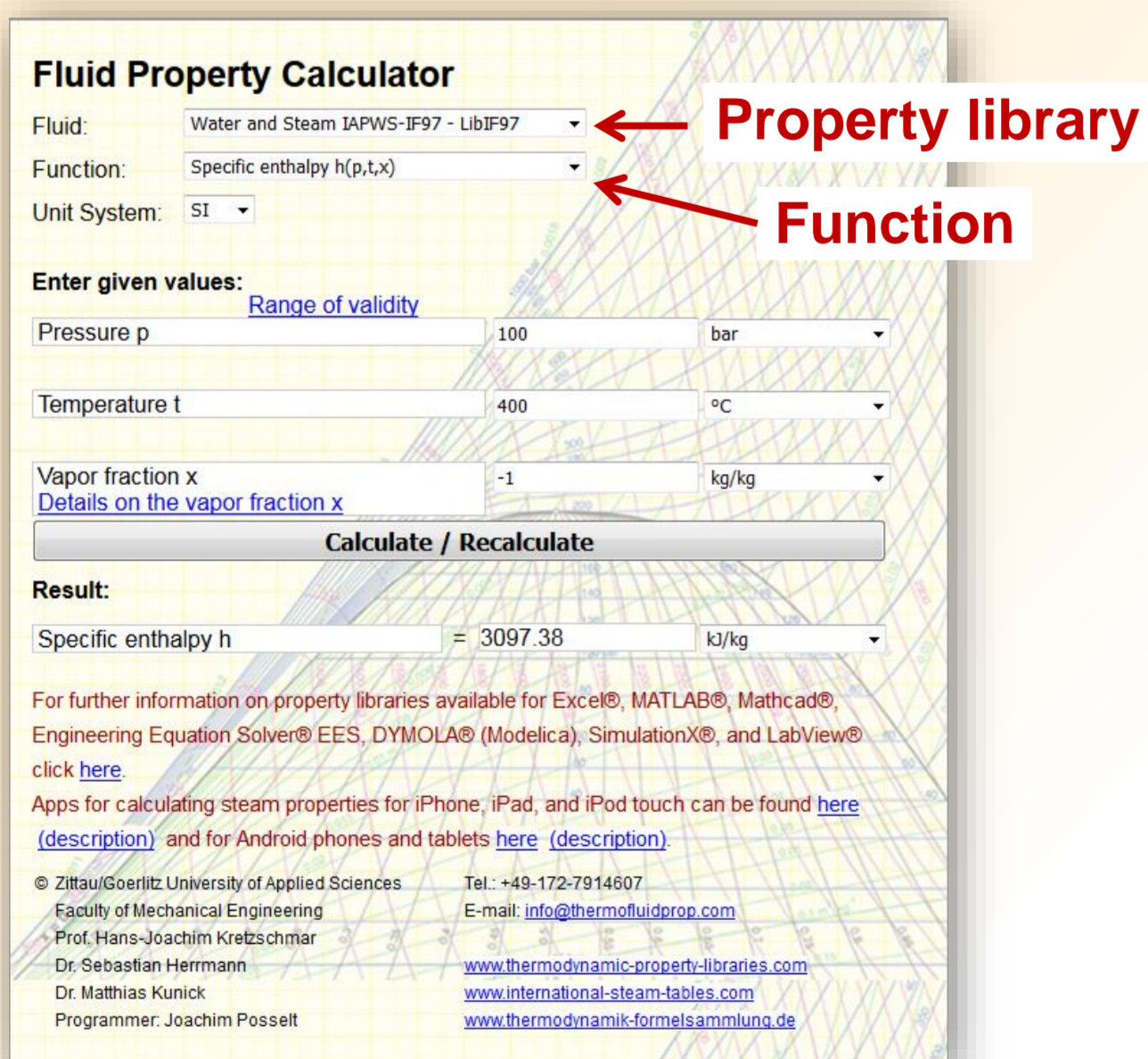
FluidLAB for MATLAB & Simulink



Function call of FluidLAB

- FluidMAT for Mathcad
- FluidPRIME for Mathcad Prime
- FluidVIEW for LabVIEW
- FluidDYM for Dymola
- FluidEES for EES
- FluidPYT for Python
- FluidJAVA for Java
- FluidLINUX for Linux
- FluidMAC for macOS, etc.

Online Property Calculator



Property library

Function

App International Steam Tables for iPhone, iPad, Android Phones and Tablets



Property Libraries for Fast Calculations Using the Spline-Based Table Look-up Method (SBTL)

Steam and water

LibSBTL_IF97
LibSBTL_95

Humid air

LibSBTL_HuAir

www.fluid-property-calculator.com

The following thermodynamic and transport properties can be calculated^a:

Thermodynamic Properties

- Vapor pressure p_s
- Saturation temperature T_s
- Density ρ
- Specific volume v
- Enthalpy h
- Internal energy u
- Entropy s
- Exergy e
- Isobaric heat capacity c_p
- Isochoric heat capacity c_v

Transport Properties

- Dynamic viscosity η
- Kinematic viscosity ν
- Thermal conductivity λ
- Prandtl number Pr
- Thermal diffusivity a

Inverse Functions

- $T, v, s(p, h)$
- $T, v, h(p, s)$
- $p, T, v(h, s)$
- $p, T(v, h)$
- $p, T(v, u)$

Thermodynamic Derivatives

- Typically required partial derivatives are also calculable.

^a Not all of these property functions are available in all property libraries listed before.