Package ‘Rpvt’

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RdMacros Rdpack

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pvt_gas

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Description

The \texttt{pvt_gas()} generates a table of gas PVT properties at reservoir temperature and pressures from the atmospheric condition up to the initial reservoir pressure. The estimated properties are compressibility factor, formation volume factor, density, compressibility, viscosity, and pseudo-pressure.

Usage

\begin{verbatim}
pvt_gas(
  input_unit = "Field",
  output_unit = "Field",
  fluid = "wet_gas",
  pvt_model = "DAK",
  visc_model = "Sutton",
  t = 300,
  p = 5000,
  gas_spgr = 0.69,
  nhc_composition = c(0, 0, 0),
  cgr = 3,
  cond_api = 42,
  warning = "yes"
)
\end{verbatim}

Arguments

\begin{itemize}
  \item input_unit \hspace{1cm} input unit system for parameters, a character string either 'SI' or 'Field'
  \item output_unit \hspace{1cm} output unit system for properties, a character string either 'SI' or 'Field'
  \item fluid \hspace{1cm} fluid type, a character string either 'dry_gas' or 'wet_gas'
  \item pvt_model \hspace{1cm} PVT model, the character string 'DAK'
  \item visc_model \hspace{1cm} viscosity model, the character string 'Sutton'
  \item t \hspace{1cm} temperature, a numeric value either in 'C' or 'F' depending on the 'input_unit'
  \item p \hspace{1cm} pressure, a numeric value either in 'kPag' or 'Psig' depending on the 'input_unit'
  \item gas_spgr \hspace{1cm} gas specific gravity (Air = 1.0)
\end{itemize}
nhc_composition  
- a vector of mole fractions for nitrogen, hydrogen sulfide, and carbon dioxide, respectively

cgr  
- condensate to gas ratio, a numeric value in 'm3/m3' or 'STB/MMSCF' depending on the 'input_unit'

cond_api  
- condensate API

warning  
- a character string either 'yes' or 'no'

References


Examples

```r
pvt_gas_results_1 <- pvt_gas(input_unit = "Field", output_unit = "Field", fluid = "dry_gas", pvt_model = "DAK", visc_model = "Sutton", t = 400, p = 20000, gas_spgr = 0.65, nhc_composition = c(0.05,0.02,0.04), cgr = 0.0, cond_api = NULL, warning = "yes")

head(pvt_gas_results_1)

pvt_gas_results_2 <- pvt_gas(input_unit = "Field", output_unit = "Field", fluid = "wet_gas", pvt_model = "DAK", visc_model = "Sutton", t = 300, p = 20000, gas_spgr = 0.75, nhc_composition = c(0.02,0.05,0.08), cgr = 10.0, cond_api = 42.4, warning = "yes")

head(pvt_gas_results_2)
```

**pvt_oil**

Create a matrix of PVT properties for black oil samples

**Description**

The `pvt_oil()` generates a table of oil and gas PVT properties at reservoir temperature and pressures from the atmospheric condition up to the initial reservoir pressure. The estimated oil properties are solution gas-oil ratio, formation volume factor, density, compressibility, and viscosity. Estimated PVT properties for the associated gas are compressibility factor, formation volume factor, density, compressibility, and pseudo-pressure.
Usage

pvt_oil(
  input_unit = "SI",
  output_unit = "SI",
  fluid = "black_oil",
  pvt_model = "Standing",
  visc_model = "Beggs_Robinson",
  t = 85.4,
  p = 35000,
  oil_api = 38,
  gas_spgr = 0.67,
  nhc_composition = c(0, 0, 0),
  rsi = NULL,
  pb = 29500,
  warning = "yes"
)

Arguments

input_unit input unit system for parameters, a character string either 'SI' or 'Field'
output_unit output unit system for properties, a character string either 'SI' or 'Field'
fluid fluid type, the character string 'black_oil'
pvt_model PVT model, a character string. 'Standing', 'Vasquez_Beggs', 'Farshad_Petrosky', 'Al_Marhoun', and 'Glaso' models are currently available
visc_model viscosity model, a character string. 'Beggs_Robinson', and 'Al_Marhoun' models are currently available
t temperature, a numeric value either in 'C' or 'F' depending on the 'input_unit'
p pressure, a numeric value either in 'kPag' or 'Psig' depending on the 'input_unit'
oil_api API gravity of oil
gas_spgr gas specific gravity (Air = 1.0)
nhc_composition a vector of mole fractions for nitrogen, hydrogen sulfide, and carbon dioxide, respectively
rsi initial solution gas oil ratio in 'm3/m3' or 'SCF/STB' depending on the 'input_unit'. It is either NULL or a numeric value. If 'rsi' is NULL, then a numeric value must be assigned to 'pb'
pb bubble point pressure, a numeric value either in 'kPag' or 'Psig' depending on the 'input_unit'. It is either NULL or a numeric value. If 'pb' is NULL, then a numeric value must be assigned to 'rsi'
warning a character string either 'yes' or 'no'

References

Examples

```r
pvt_oil_results_1 <- pvt_oil(input_unit = "Field", output_unit = "Field", fluid = "black_oil", pvt_model = "Standing", visc_model = "Beggs_Robinson", t = 200, p = 3000, oil_api = 35, gas_spgr = 0.8, nhc_composition = c(0.05,0.02,0.04), rsi = 650, pb = NULL, warning = "no")
head(pvt_oil_results_1)

pvt_oil_results_2 <- pvt_oil(input_unit = "SI", output_unit = "Field", fluid = "black_oil", pvt_model = "Vasquez_Beggs", visc_model = "Al_Marhoun", t = 80, p = 20000, oil_api = 34.4, gas_spgr = 0.65, nhc_composition = c(0.0,0.0,0.0), rsi = NULL, pb = 11350, warning = "yes")
head(pvt_oil_results_2)
```

Create a matrix of PVT properties for reservoir water samples
Description

The \texttt{pvt\_water()} generates a table of water PVT properties at reservoir temperature and pressures from the atmospheric condition up to the initial reservoir pressure. The estimated water properties are solution gas-water ratio, formation volume factor, density, compressibility, and viscosity.

Usage

\begin{verbatim}
pvt_water(
    input_unit = "Field",
    output_unit = "Filed",
    fluid = "water",
    pvt_model = "Spivey",
    visc_model = "Spivey",
    t = 220,
    p = 6000,
    salinity = 10,
    gas_saturated = "yes",
    warning = "yes"
)
\end{verbatim}

Arguments

- \texttt{input\_unit}: input unit system for parameters, a character string either 'SI' or 'Field'.
- \texttt{output\_unit}: output unit system for properties, a character string
- \texttt{fluid}: fluid type, the character string 'water'
- \texttt{pvt\_model}: PVT model, a character string. 'Spivey', 'Meehan', and 'McCain' models are currently available
- \texttt{visc\_model}: viscosity model, a character string. 'Spivey', 'Meehan', and 'McCain' models are currently available
- \texttt{t}: temperature, a numeric value either in 'C' or 'F' depending on the 'input\_unit'
- \texttt{p}: pressure, a numeric value either in 'kPag' or 'Psig' depending on the 'input\_unit'
- \texttt{salinity}: water salinity in weight percent TDS
- \texttt{gas\_saturated}: a character string either 'yes' or 'no'
- \texttt{warning}: a character string either 'yes' or 'no'

References


Examples

```r
pvt_water_results_1 <- pvt_water(input_unit = "Field", output_unit = "Field", fluid = "water", pvt_model = "McCain", visc_model = "McCain", t = 300, p = 5000, salinity = 10, gas_saturated = "yes", warning = "no")

head(pvt_water_results_1)

pvt_water_results_2 <- pvt_water(input_unit = "SI", output_unit = "SI", fluid = "water", pvt_model = "Spivey", visc_model = "Spivey", t = 100, p = 15000, salinity = 0.0, gas_saturated = "no", warning = "no")

head(pvt_water_results_2)
```
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