Psat_Antoine_databank.m

```
function Psat = Psat_Antoine_databank( i, T )
%saturated vapor pressures from Antoine's equation for pure substances

%data from Towler and Sinnott (2013), Appendix C
%T entered in degC, Psat given in mm Hg

%components
%i =  1: water
%i =  2: n-butane
%i =  3: n-pentane
%i =  4: n-hexane
%i =  5: n-heptane
%i =  6: n-octane
%i =  7: n-nonane
%i =  8: n-decane
%i =  9: n-hexadecane
%i = 10: benzene
%i = 11: toluene
%i = 12: ethylbenzene
%i = 13: 1-propylbenzene (n-propylbenzene)
%i = 14: 1-butylbenzene  (n-butylbenzene)
%i = 15: methanol
%i = 16: ethanol
%i = 17: 1-propanol      (n-propanol)
%i = 18: 1-butanol       (n-butanol)
%i = 19: 1-pentanol      (n-pentanol)
%i = 20: 1-octanol       (n-octanol)
%i = 21: L-lactic acid
%i = 22: L-lactide

a( 1) = 18.3036; b( 1) = 3816.44; c( 1) =  -46.13;
a( 2) = 15.6782; b( 2) = 2154.90; c( 2) =  -34.42;
a( 3) = 15.8333; b( 3) = 2477.07; c( 3) =  -39.94;
a( 4) = 15.8366; b( 4) = 2697.55; c( 4) =  -48.78;
a( 5) = 15.8737; b( 5) = 2911.32; c( 5) =  -56.51;
a( 6) = 15.9426; b( 6) = 3120.29; c( 6) =  -63.63;
a( 7) = 15.9671; b( 7) = 3291.45; c( 7) =  -71.33;
a( 8) = 16.0114; b( 8) = 3456.80; c( 8) =  -78.67;
a( 9) = 16.1841; b( 9) = 4214.91; c( 9) = -118.70;
a(10) = 15.9008; b(10) = 2788.51; c(10) =  -52.36;
a(11) = 16.0137; b(11) = 3096.52; c(11) =  -53.67;
a(12) = 16.0195; b(12) = 3279.47; c(12) =  -59.95;
a(13) = 16.0062; b(13) = 3433.84; c(13) =  -66.01;
a(14) = 16.0793; b(14) = 3633.40; c(14) =  -71.77;
a(15) = 18.5875; b(15) = 3626.55; c(15) =  -34.29;
a(16) = 18.9119; b(16) = 3803.98; c(16) =  -41.68;
a(17) = 17.5439; b(17) = 3166.38; c(17) =  -80.15;
a(18) = 17.2160; b(18) = 3137.02; c(18) =  -94.43;
a(19) = 16.5270; b(19) = 3026.89; c(19) = -105.00;
a(20) = 15.7428; b(20) = 3017.81; c(20) = -137.10;
a(21) = 16.0785; b(21) = 4276.57; c(21) =  -91.00;
a(22) = 19.6150; b(22) = 7279.91; c(22) =    0.00;

Psat = exp(a(i) - b(i) / (T + 273.15 + c(i)));

end
```

Psat_Antoine.m

```
function Psat = Psat_Antoine( i, T )
%saturated vapor pressures from Antoine's equation for pure substances

%components
%i =  1: benzene
%i =  2: toluene

if i == 1
    ii = 10;
else
    ii = 11;
end

Psat = Psat_Antoine_databank( ii , T );

end
```

Session

```
>> Psat_Antoine(1,80.1)

ans =

  759.9559

>> Psat_Antoine(2,110.6)

ans =

  759.4392

>>
```

Comments

The function Psat_Antoine_databank acts as repository of Antoine's equation constants for many pure substances. It only needs to be written once.

The function Psat_Antoine draws from Psat_Antoine_databank to define Antoine's equations for only benzene (i = 1) and toluene (i = 2). This function would be written for calculations involving binary mixtures of benzene and toluene, and makes it possible to speak of components 1 and 2 instead of 10 and 11. (Who would want to number the components of a binary mixture as 10 and 11?)

Psat for benzene comes out very close to 760 mm Hg at 80.1 degC, which is the normal boiling point of benzene. Psat for toluene comes out very close to 760 mm Hg at 110.6 degC, which is the normal boiling point of toluene. Thus, the Matlab session carries out a check on the Antoine's equations for benzene and toluene.

How *very* nice!