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// ExponentialSingle.mod

import nsrunit; unit conversion on;
/*
Enter only the bold face text for your model.
This is a mathematical model expressing clearance as exponential decay
The Ordinary Differential Equation (ODE) for clearance is

    dC/dt = -k*C.

In JSim's Mathematical Modeling Language (MML) this is
expressed as

    C:t = -k*C;

Analytic Solution          C(t)=C0*exp(-k*t)

Half Life:
Let                       C0/2 = C0*exp(-k*thalf)
Divide both sides by C0   1/2 = exp(-k*thalf)
Take natural log of both sides
ln(1/2)=ln(1)-ln(2)= -ln(2) = -k*thalf
Divide both sides by -thalf   ln(2)/thalf= k

We will write the equation in MML as

    C:t=-ln(2)/thalf*C;

The initial condition in MML is given as
    when(t=t.min) C=C0;
*/
math SalicylicAcidClearance {
realDomain t hour; t.min=0; t.max=16.0; t.delta=0.05;
// Independent Variable
real C(t) mg/L; // Time dependent variable
real C0 = 1 mg/L; // Initial Concentration
real thalf =5 hour; // Half life
when(t=t.min) C=C0; // Setting Initial Condition
C:t=-ln(2)/thalf*C; // Ordinary Differential Equation
} // Don't forget closing brace
/* Some syntax rules for a MML program

import nsrunit; unit conversion on; always include for unit checking
Units are never plural.

math ProgramName {
    Mandatory (at least for now)
    realDomain name units; name.min=0; name.max=10; name.delta=0.1;
*/ Every statement terminates with a semi-colon.
Don't forget concluding bracket "}".

If the program says an error on line n, check line n-1 as well for
missing semicolon.
*/

```