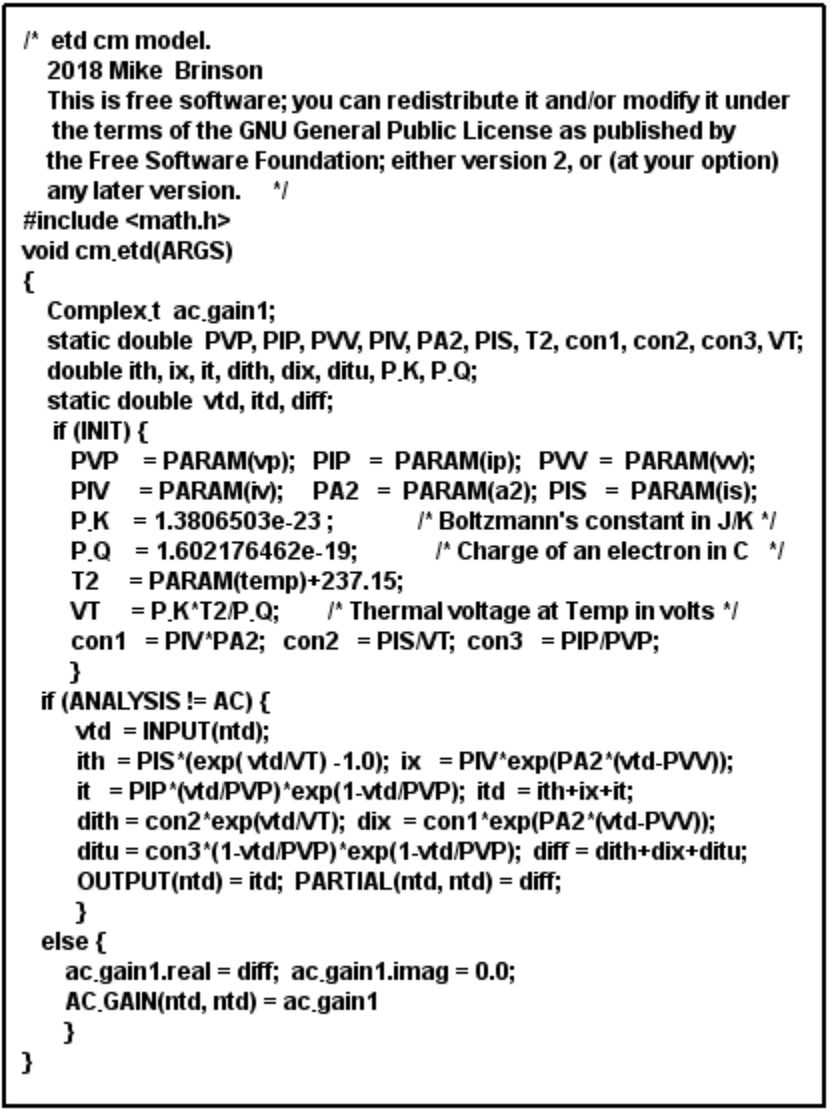

```
/*  etd cm model.
   2018 Mike  Brinson
   This is free software; you can redistribute it and/or modify it under
    the terms of the GNU General Public License as published by
   the Free Software Foundation; either version 2, or (at your option)
   any later version.     */
#include <math.h>
void cm_etd(ARGS)
{
   Complex_t  ac_gain1;
   static double  PVP, PIP, PVV, PIV, PA2, PIS, T2, con1, con2, con3, VT;
   double ith, ix, it, dith, dix, ditu, P_K, P_Q;
   static double  vtd, itd, diff;
    if (INIT) {
      PVP    = PARAM(vp);   PIP   =  PARAM(ip);   PVV  =  PARAM(vv);
      PIV    = PARAM(iv);    PA2   =  PARAM(a2);  PIS   =  PARAM(is);
      P_K    = 1.3806503e-23 ;             /* Boltzmann's constant in J/K */
      P_Q    = 1.602176462e-19;            /* Charge of an electron in C   */
      T2     = PARAM(temp)+237.15;
      VT     = P_K*T2/P_Q;        /* Thermal voltage at Temp in volts */
      con1   = PIV*PA2;   con2   = PIS/VT;  con3   = PIP/PVP;
      }
  if (ANALYSIS != AC) {
       vtd  = INPUT(ntd);
       ith  = PIS*(exp( vtd/VT) -1.0);  ix   = PIV*exp(PA2*(vtd-PVV));
       it   = PIP*(vtd/PVP)*exp(1-vtd/PVP);  itd  = ith+ix+it;
       dith = con2*exp(vtd/VT);  dix  = con1*exp(PA2*(vtd-PVV));
       ditu = con3*(1-vtd/PVP)*exp(1-vtd/PVP);  diff = dith+dix+ditu;
       OUTPUT(ntd) = itd;  PARTIAL(ntd, ntd) = diff;
       }
  else {
     ac_gain1.real = diff;  ac_gain1.imag = 0.0;
     AC_GAIN(ntd, ntd) = ac_gain1
      }
}
```