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```
#include <math.h>

/* Local Volatility Examples Sigma(t,x) */
double premia_local_vol(double t, double x, int sigma_type)
{
    double val;
    switch (sigma_type)
    {
        case 0:
            val = 15. / x;
            break;
        case 1:
            val = 0.01 + 0.1 * exp(-x / 100) + 0.01 * t;
            break;
        default:
            val = 0.;
    }
    if (val >= 1.) val = 1.;
    if (val <= 0.01) val = 0.01;

    return val;
}

/* First Order Derivatives Sigma(t,x) for Adaptive Method*/
double premia_local_vol_x(double t, double x, int sigma_type)
{
    double val;
    switch (sigma_type)
    {
        case 0:
            val = -15. / (x * x);
            break;
        case 1:
            val = -0.1 / 100 * exp(-x / 100);
            break;
        default:
            val = 0.;
    }
    return val;
}
```

```
}

/* Second Order Derivatives Sigma(t,x) for Adaptive Method */
double premia_local_vol_xx(double t, double x, int sigma_type)
{
    double val;
    switch (sigma_type)
    {
        case 0:
            val = 30. / (x * x * x);
            break;
        case 1:
            val = 0.1 / (100. * 100.) * exp(-x / 100);
            break;
        default:
            val = 0.;
    }
    return val;
}
```