**Аппроксимация с использованием квадратичной функции**

```
program tu134;
const n=6;
x:array[1..n] of real=(300,400,500,600,700,800);
y:array[1..n] of real=(6.97,7.01,7.12,7.28,7.45,7.62);
var
i:integer;
xx,yy,s1,s2, s3,s4,s5,s6,s7,a0,a1,a2, d1,d2,d3,d4:real;
begin
for i:=1 to n do begin
s1:=s1+x[i];
s2:=s2+y[i];
s3:=s3+sqr(x[i]);
s4:=s4+x[i]*y[i];
s5:=s5+sqr(x[i])*x[i];
s6:=s6+sqr(x[i])*y[i];
s7:=s7+x[i]*x[i]*x[i]*x[i];
end;
d1:=n*s3*s7+s1*s5*s3+s1*s5*s3-s3*s3*s3-s1*s1*s7-n*s5*s5;
d2:=s2*s3*s7+s4*s5*s3+s6*s1*s5-s6*s3*s3-s2*s5*s5-s4*s1*s7;
d3:=n*s4*s7+s1*s6*s3+s3*s2*s5-s3*s3*s4-s1*s2*s7-s6*s5*n;
d4:=n*s3*s6+s1*s5*s2+s1*s4*s3-s3*s3*s2-s5*s4*n-s1*s1*s6;
a0:=d2/d1;
a1:=d3/d1;
a2:=d4/d1;
writeln('a0=', a0:5:3, 'a1=', a1:5:3, 'a2=', a2:5:3);
xx:=800;
yy:=a0+a1*xx+a2*sqr(xx);
writeln('yy= ',yy:5:2);
end.
```

$$\begin{cases} na_0 + a_1\sum_{i=1}^{n} x_i + a_1\sum_{i=1}^{n} x_i^2 = \sum_{i=1}^{n} y_i \\ a_0\sum_{i=1}^{n} x_i + a_1\sum_{i=1}^{n} x_i^2 + a_1\sum_{i=1}^{n} x_i^3 = \sum_{i=1}^{n} y_i \cdot x_i \\ a_0\sum_{i=1}^{n} x_i^2 + a_1\sum_{i=1}^{n} x_i^3 + a_1\sum_{i=1}^{n} x_i^4 = \sum_{i=1}^{n} y_i \cdot x_i^2 \end{cases}$$

$$S_1 = \sum_{i=1}^{n} x_i\,;\ S_2 = \sum_{i=1}^{n} y_i\,;\ S_3 = \sum_{i=1}^{n} x_i^2\,;\ S_4 = \sum_{i=1}^{n} x_i \cdot y_i\,;\ S_5 = \sum_{i=1}^{n} x_i^3\,;\ S_6 = \sum_{i=1}^{n} x_i^2 \cdot y_i\,;\ S_7 = \sum_{i=1}^{n} x_i^4\,;$$

$$a_0 = \frac{\begin{vmatrix} S_2 & S_1 & S_3 \\ S_4 & S_3 & S_5 \\ S_6 & S_5 & S_7 \end{vmatrix}}{\begin{vmatrix} n & S_1 & S_3 \\ S_1 & S_3 & S_5 \\ S_3 & S_5 & S_7 \end{vmatrix}} \qquad a_1 = \frac{\begin{vmatrix} n & S_2 & S_3 \\ S_1 & S_4 & S_5 \\ S_3 & S_6 & S_7 \end{vmatrix}}{\begin{vmatrix} n & S_1 & S_3 \\ S_1 & S_3 & S_5 \\ S_3 & S_5 & S_7 \end{vmatrix}} \qquad a_2 = \frac{\begin{vmatrix} n & S_1 & S_2 \\ S_1 & S_3 & S_4 \\ S_3 & S_5 & S_6 \end{vmatrix}}{\begin{vmatrix} n & S_1 & S_3 \\ S_1 & S_3 & S_5 \\ S_3 & S_5 & S_7 \end{vmatrix}}$$