

analytic:

t (fs)	x (Angstrom)	v (m/s)
-1	0.431079	4.03752E+14
0	0.5	0
1	0.431079	-4.03752E+14
2	0.243317	-6.96196E+14
3	-0.011524	-7.96711E+14
4	-0.263187	-6.77586E+14
5	-0.442295	-3.71661E+14
6	-0.499469	3.67239E+13
7	-0.418948	4.34985E+14
8	-0.22293	7.13328E+14
9	0.034546	7.95018E+14
10	0.282498	6.57535E+14
11	0.452571	3.38781E+14
12	0.497876	-7.33698E+13

k= 236.2271671
m= 1.67382E-27

poor equations:

t (fs)	x (Angstrom)	v (m/s)	a (m/s/s)
0	0.5	0	-1.4113E+29
1	0.42943	-7.05651E+13	-1.21212E+29
2	0.29826	-1.31171E+14	-8.4188E+28
3	0.12500	-1.73265E+14	-3.52821E+28
4	-0.06591	-1.90906E+14	1.86033E+28
5	-0.24751	-1.81605E+14	6.98631E+28
6	-0.39419	-1.46673E+14	1.11263E+29
7	-0.48523	-9.10416E+13	1.36961E+29
8	-0.50779	-2.25614E+13	1.43329E+29
9	-0.45869	4.9103E+13	1.29469E+29
10	-0.34485	1.13837E+14	9.73371E+28
11	-0.18234	1.62506E+14	5.14681E+28
12	0.00590	1.8824E+14	-1.66464E+27

verlet

t (fs)	x (Angstrom)	v (m/s)	a (m/s/s)
-1	0.431079	4.03752E+14	-1.2168E+29
0	0.5	0	-1.4113E+29
1	0.427791	-1.64427E+12	-1.2075E+29
2	0.234833	-1.32584E+14	-6.6284E+28
3	-0.024409	-2.261E+14	6.88966E+27
4	-0.276761	-2.55797E+14	7.81187E+28
5	-0.450994	-2.13293E+14	1.27298E+29
6	-0.49793	-1.10585E+14	1.40546E+29
7	-0.40432	2.33374E+13	1.14123E+29
8	-0.196586	1.50672E+14	5.54884E+28
9	0.066636	2.35478E+14	-1.8809E+28
10	0.31105	2.53818E+14	-8.7797E+28
11	0.467666	2.00515E+14	-1.32E+29
12	0.492279	9.06146E+13	-1.3895E+29