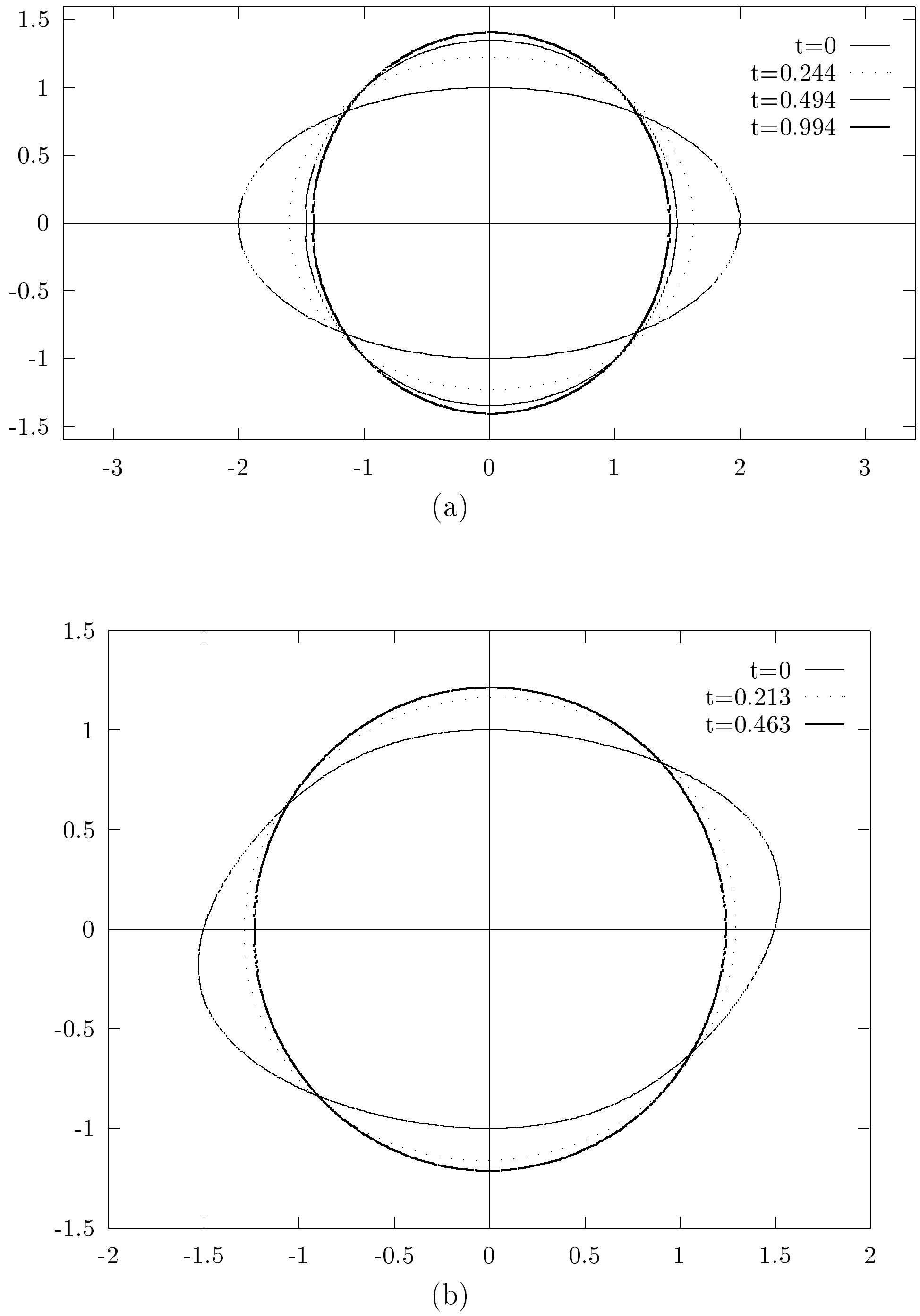


Figure 1. Examples of single particle circularizing: (a). an elliptic particle, $N = 256$; (b). a perturbed elliptic particle, $N = 512$.

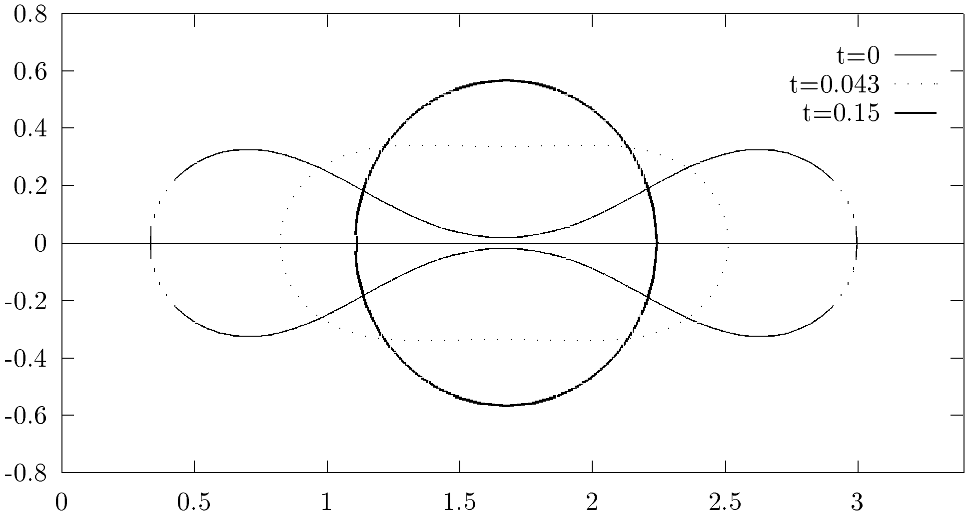


Figure 2. A dumbbell shaped particle, $N = 128$.

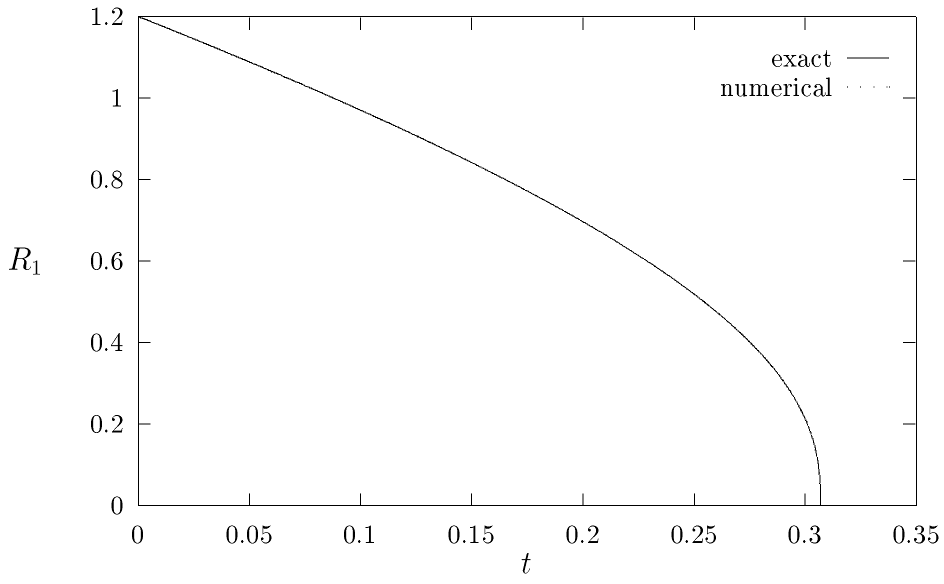
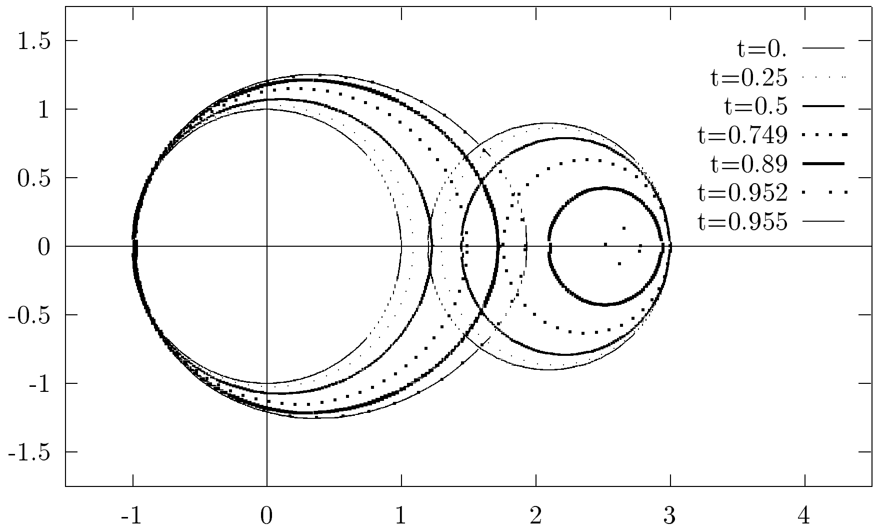
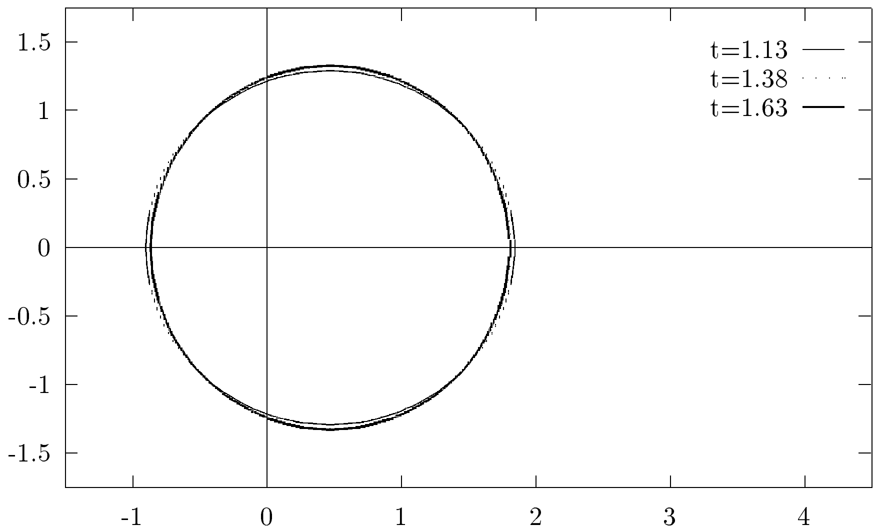


Figure 3. The inner radius R_1 of the concentric circular region, as a function of t, calculated from solving the full two-dimensional system and from solving the ODE problem.



(a)



(b)

Figure 4. Two initially circular particles with different radii, with mass transfer from the smaller particle to the larger particle; $N = 256$; (a). early time before the smaller particle disappears; (b). the circularizing of the surviving particle.

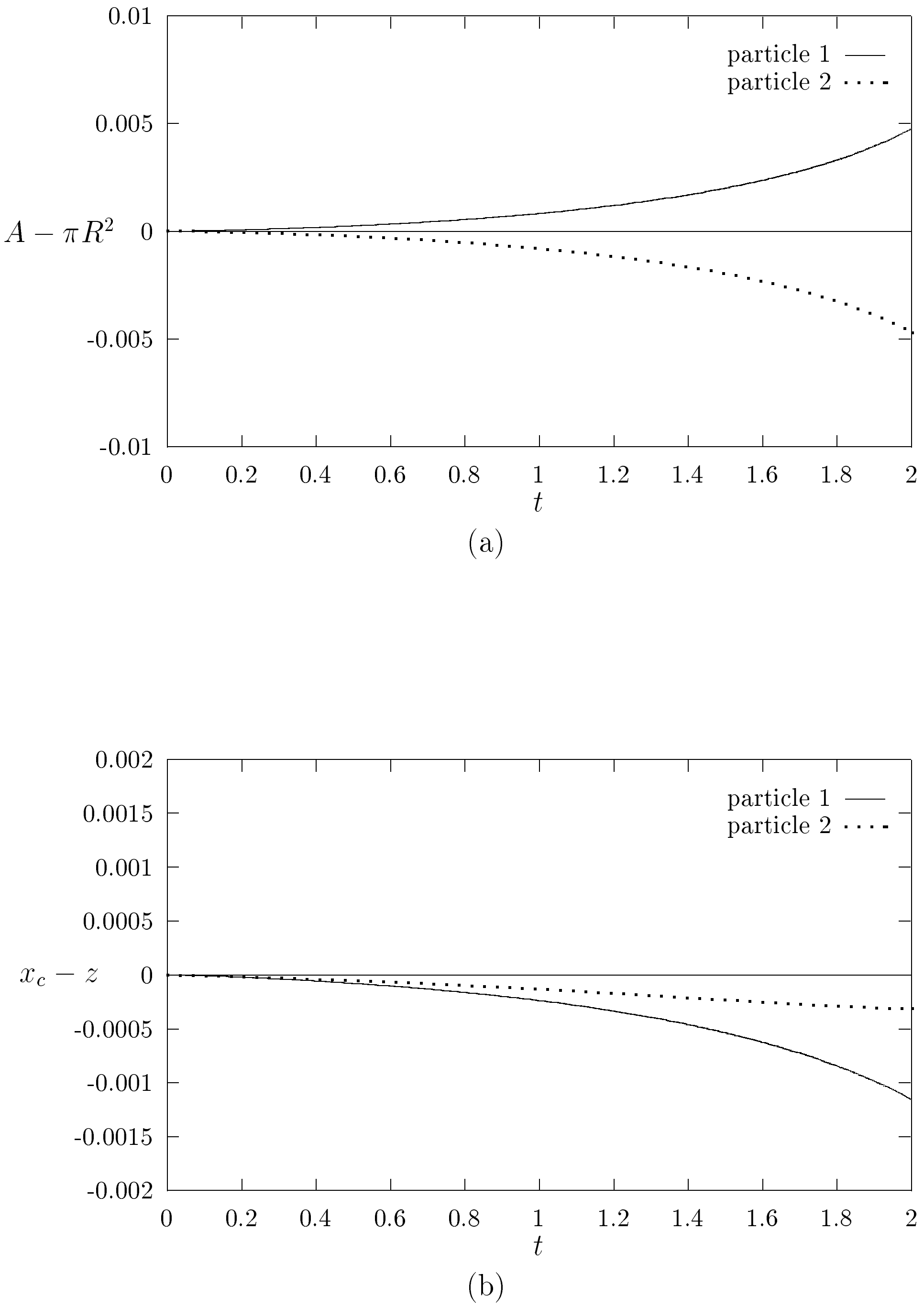
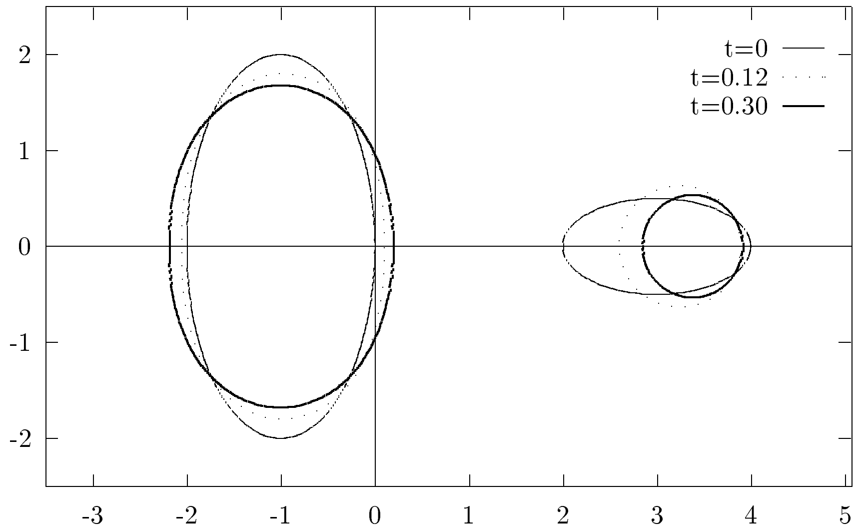
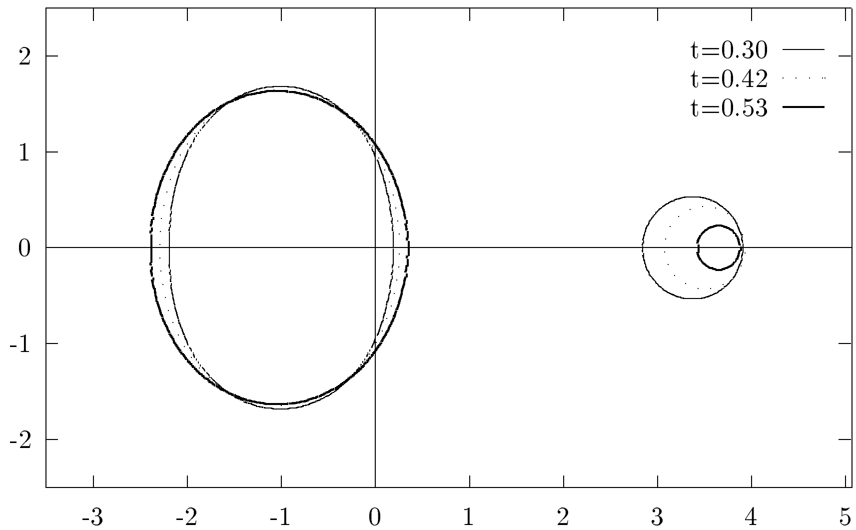


Figure 5. Comparisons of the full equation solutions to the modified ODE solutions in the case of two initially circular particles. (a). The comparison of areas; (b). the comparison of centers of mass.



(a)



(b)

Figure 6. Two initially elliptic particles at different times, $N = 384$.

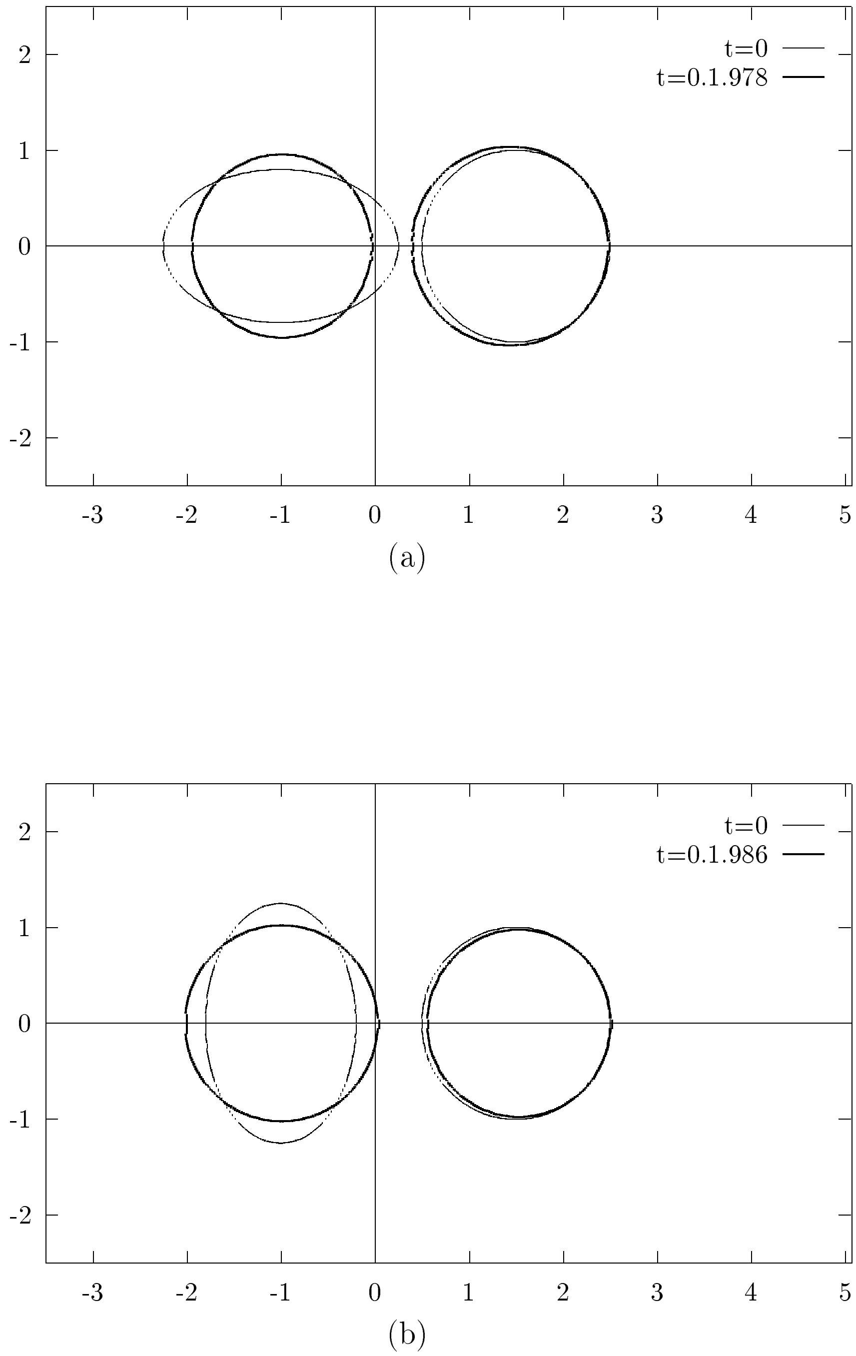


Figure 7. Two particles with the same initial mass (area), but different shapes, $N = 256$. (a). The major axis of the initial ellipse is aligned with the x-axis; (b). the major axis of the initial ellipse has an angle of $\pi/2$ with the x-axis.

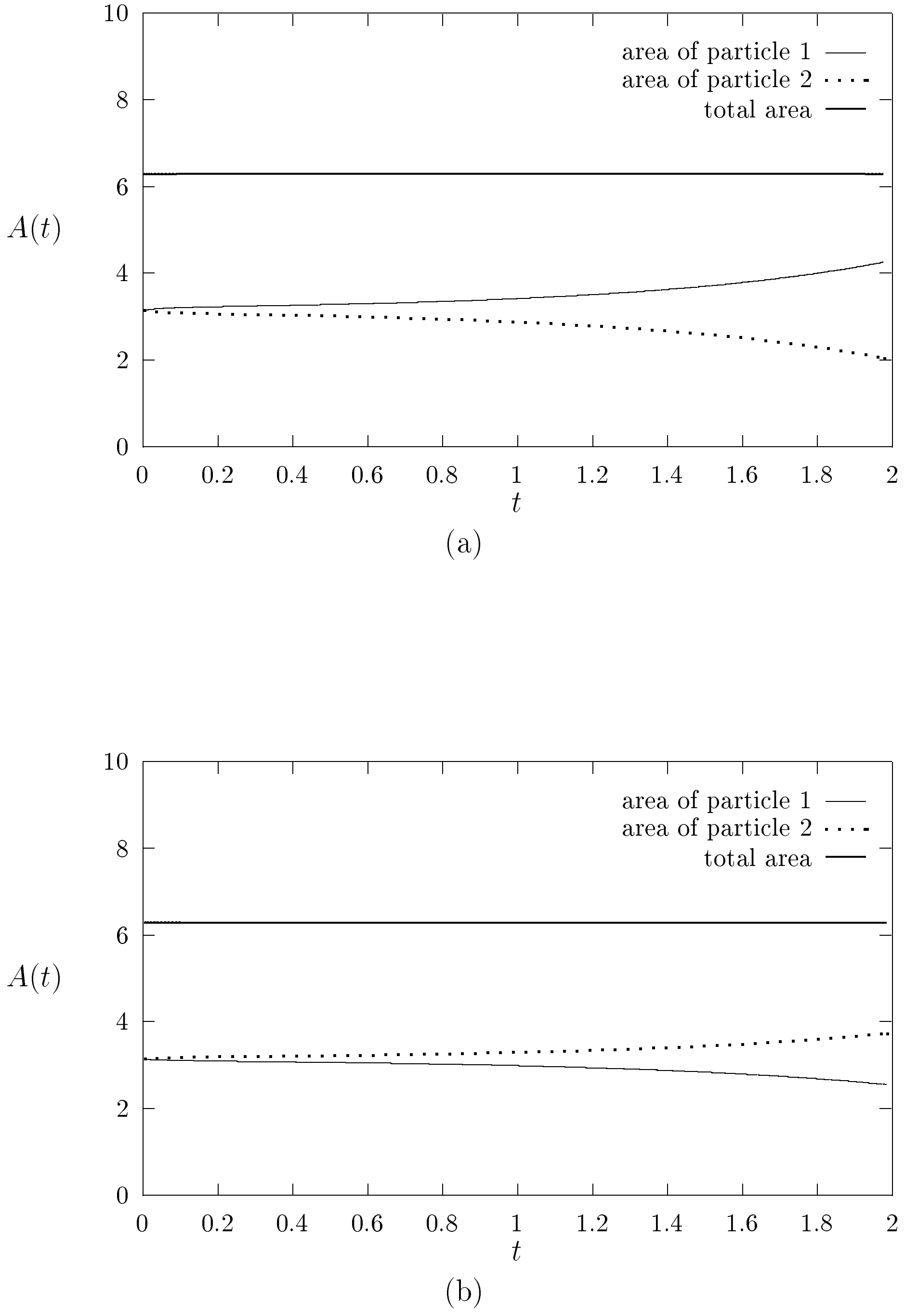


Figure 8. Areas of the particles in two different configurations.

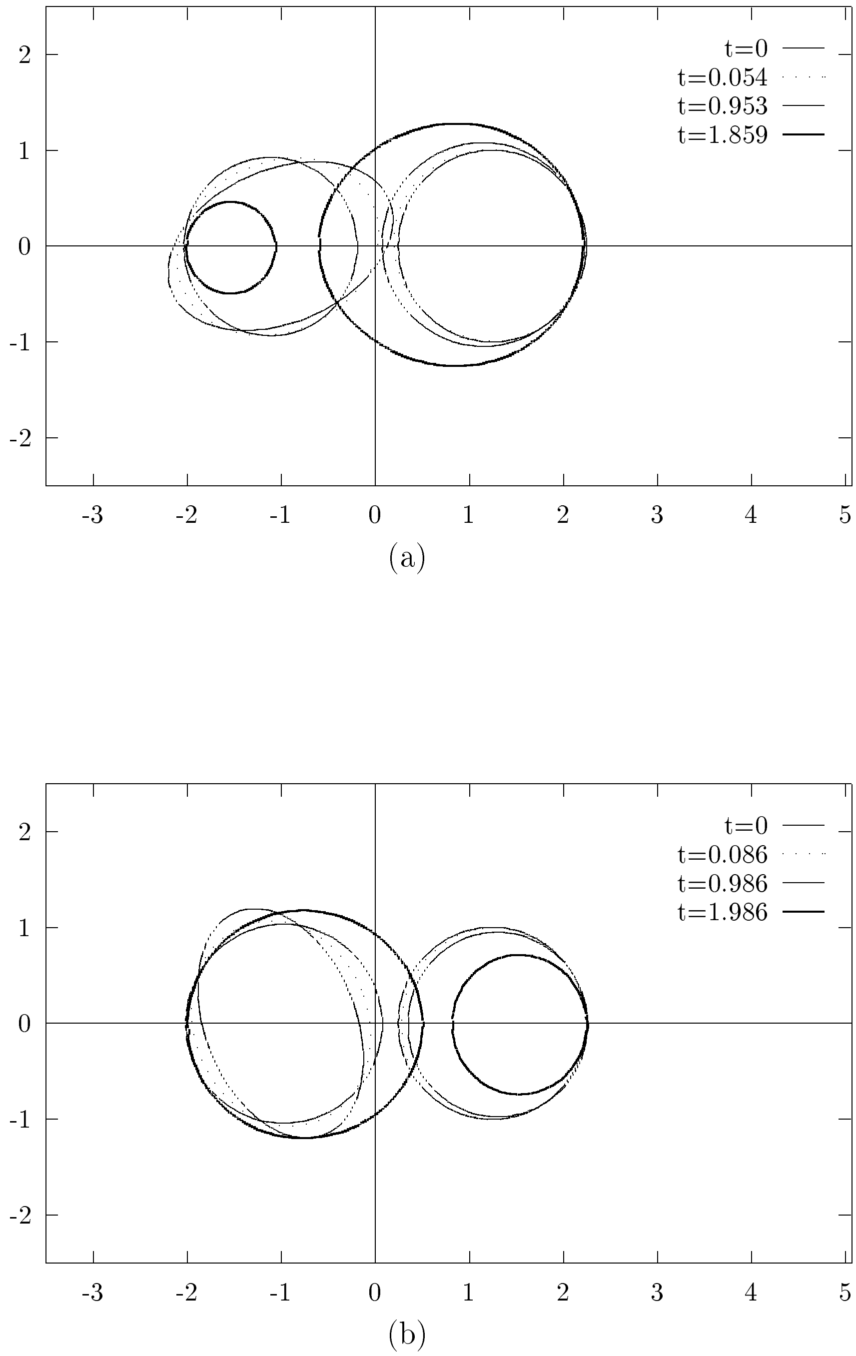
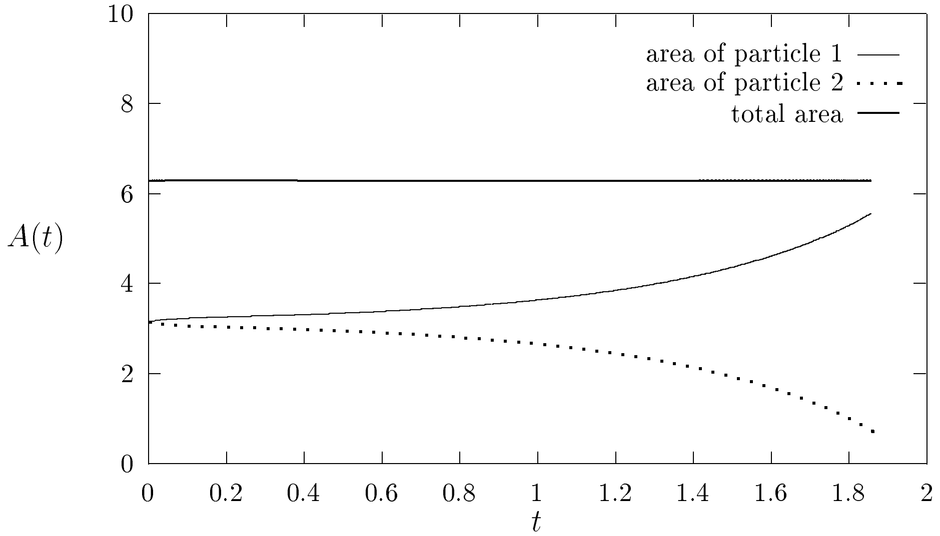
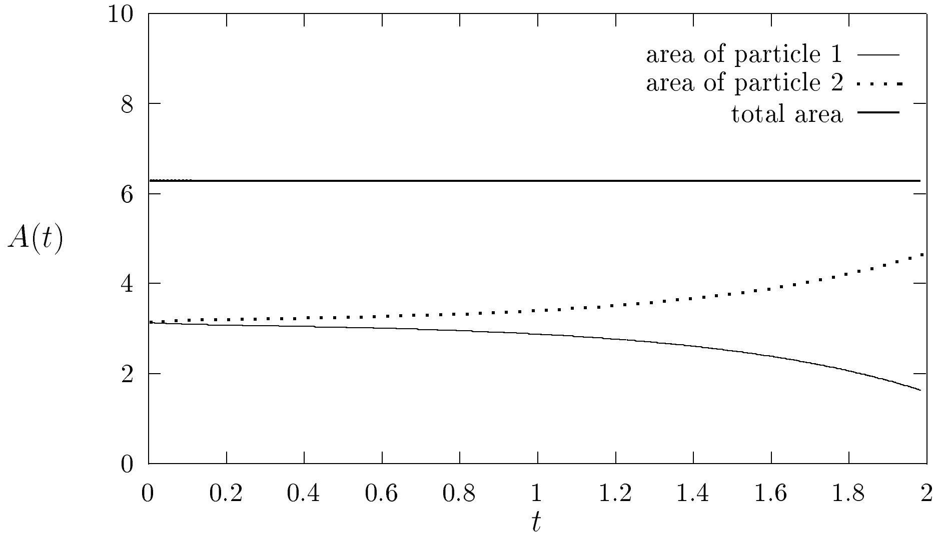


Figure 9. Two particles with the same initial mass (area), but different shapes, $N = 256$. (a). The major axis of the initial ellipse has an angle of $\pi/8$ with x-axis; (b). the minor axis of the initial ellipse has an angle of $\pi/8$ with the x-axis.



(a)



(b)

Figure 10. Areas of the particles in two different configurations, with the initial ellipse rotated by an angle of $\pi/8$.

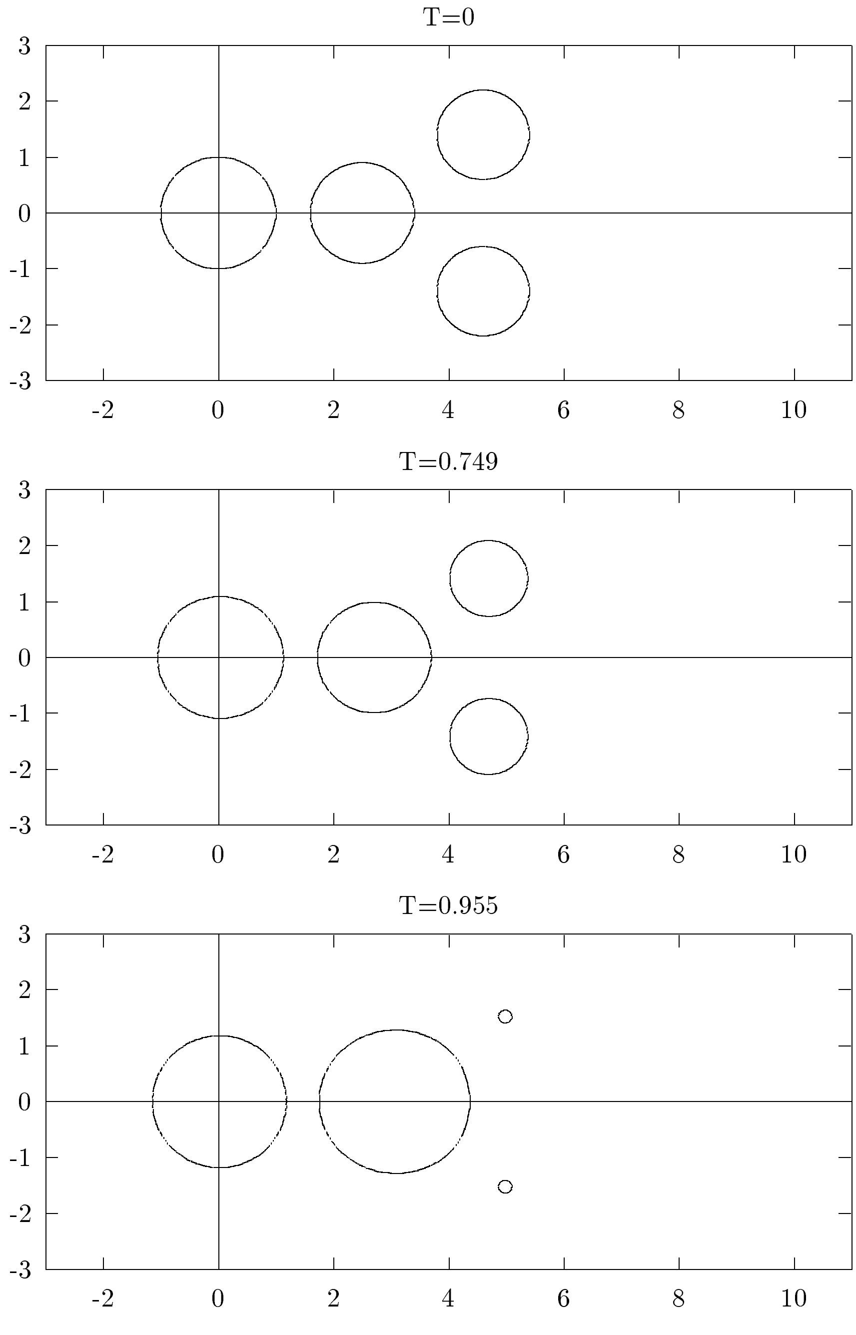
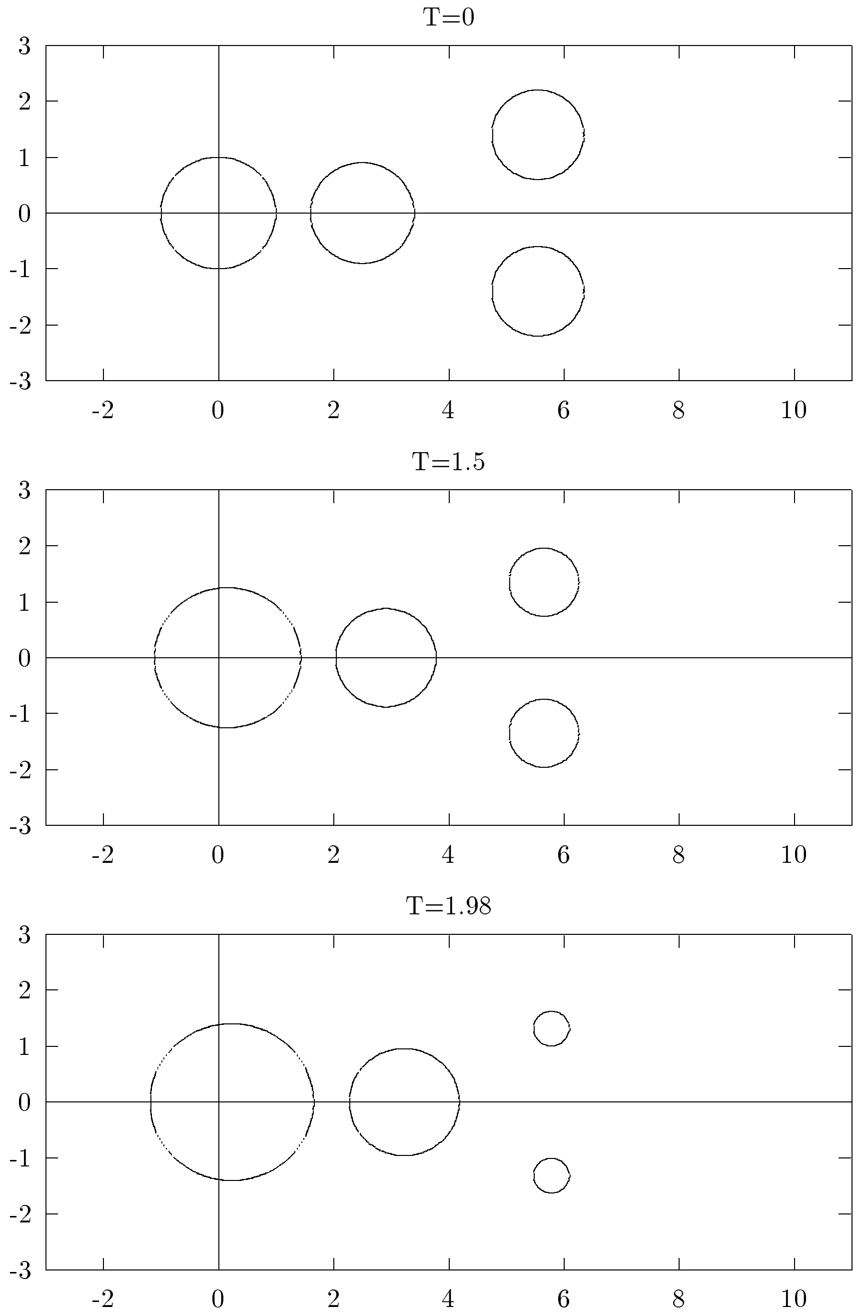
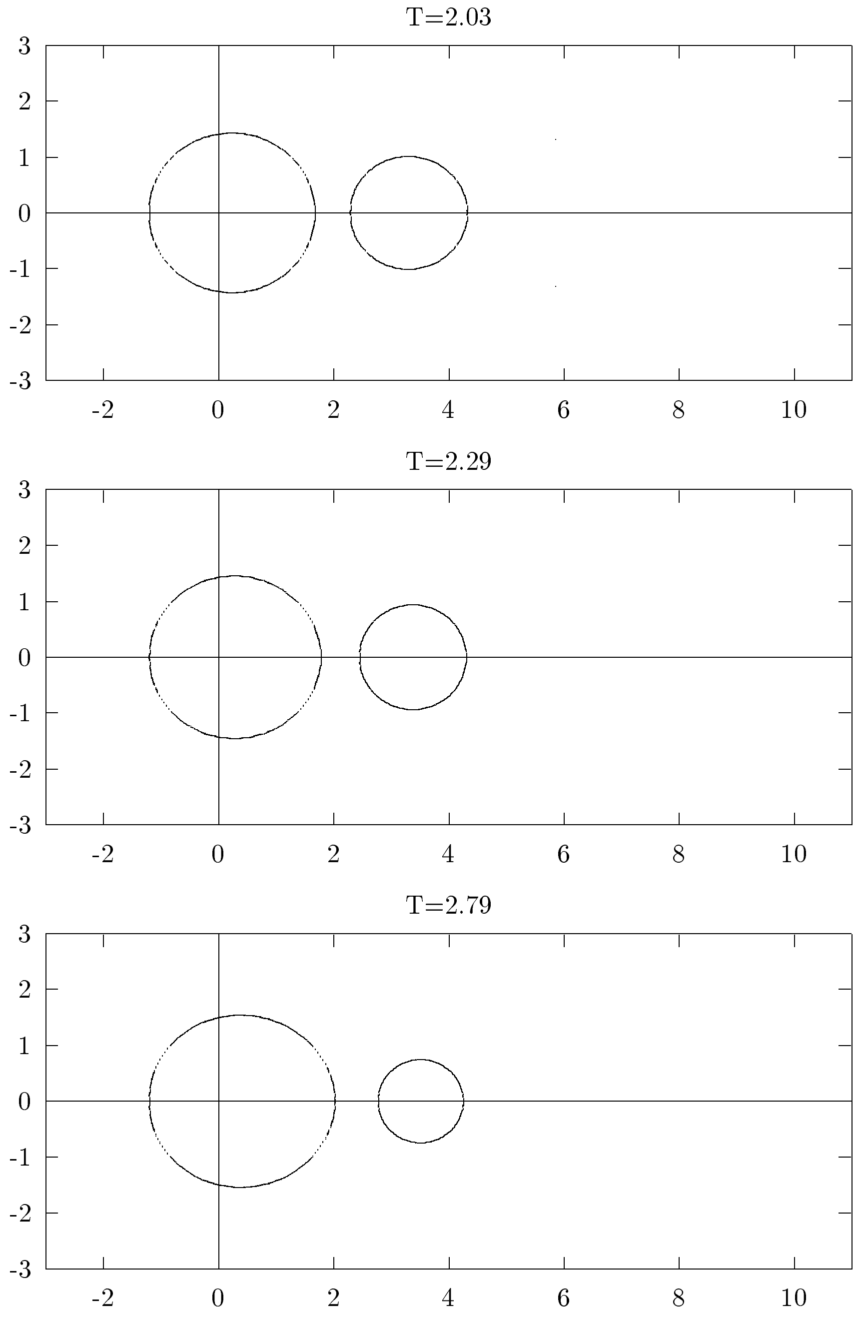


Figure 11. A four-particle system, with two smaller particles initially situated near the particle in the center, $N = 512$.



(a)

Figure 12. A four-particle system, with two smaller particles initially shifted away from the particle in the center, $N = 512$. (a). Early time before the smaller particles disappear.



(b)

Figure 12(b). A four-particle system, with two smaller particles initially shifted away from the particle in the center, $N = 512$. (b). Later time after the smaller particles disappear.

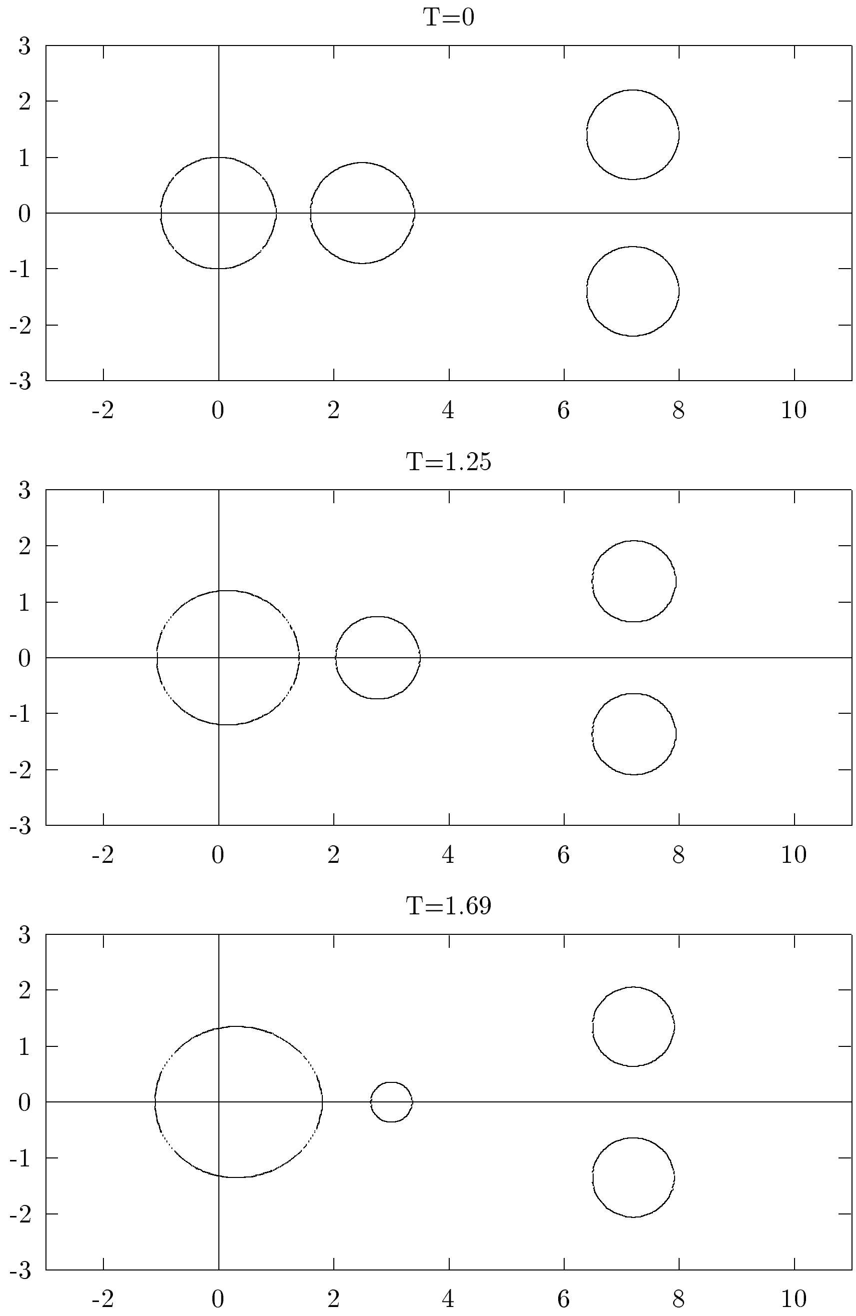


Figure 13. A four-particle system, with two smaller particles initially shifted further away from the rest of the group, $N = 512$. The middle particle is about to disappear in the end of this calculation.

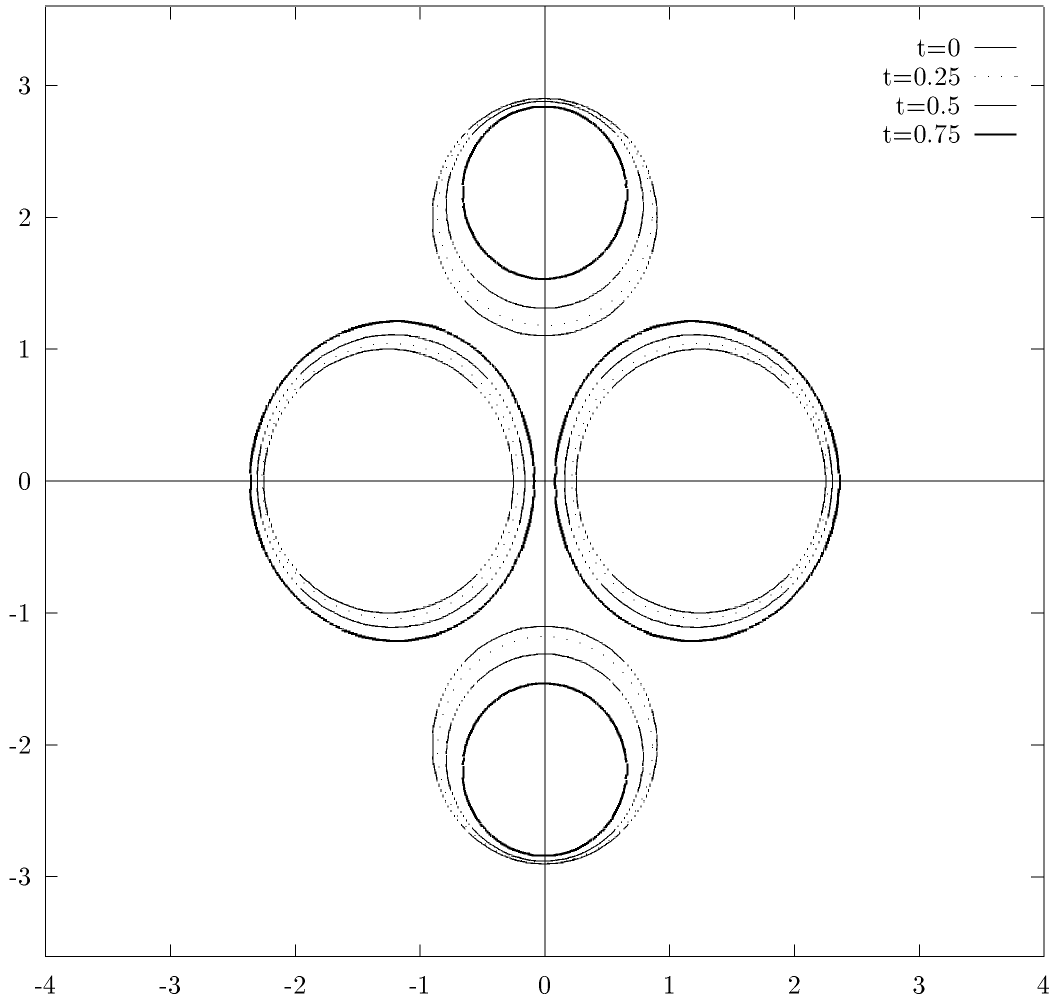


Figure 14. Two pairs of particles with same areas and a symmetric configuration, $N = 512$. The larger pair is about to touch towards the end of this calculation.

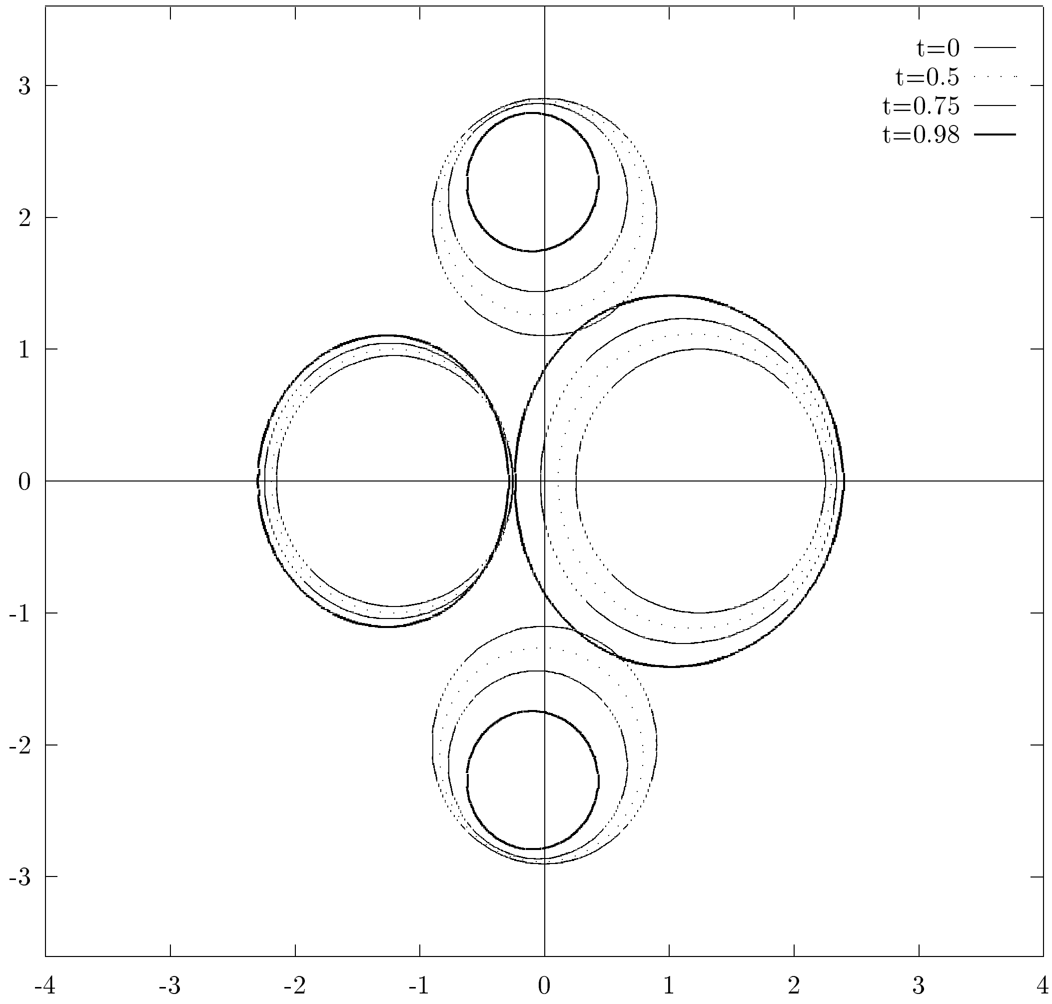


Figure 15. Two pairs of particles with different areas, $N = 512$. The larger particles are about to touch towards the end of the calculation.

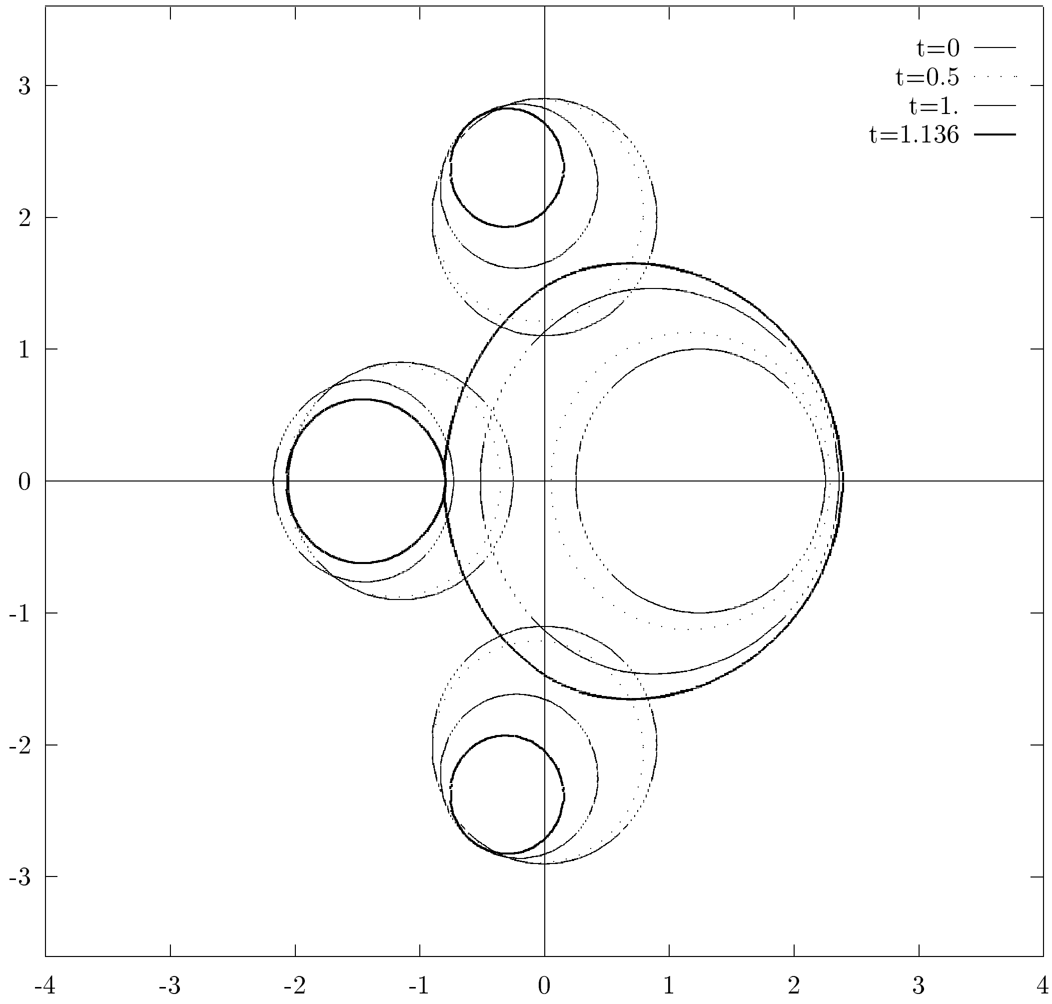
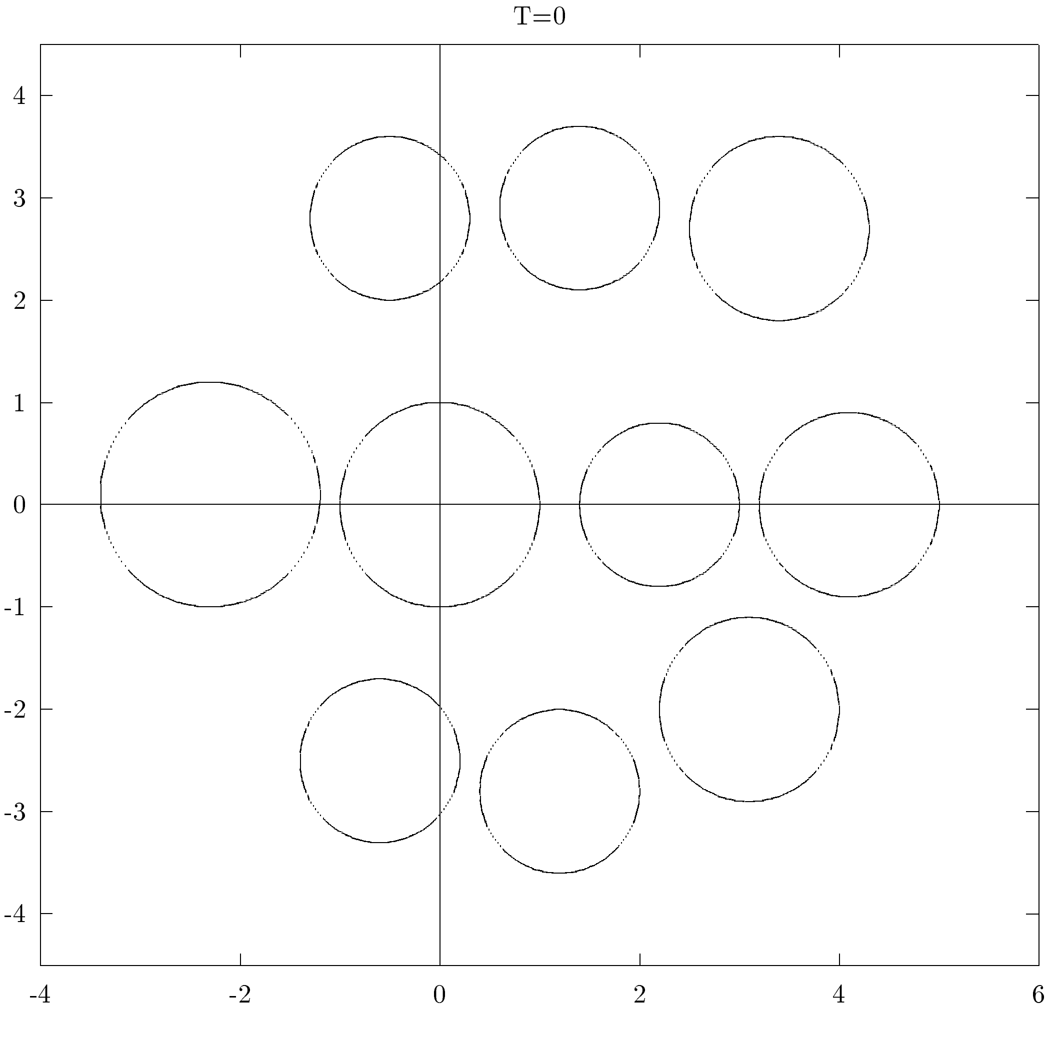
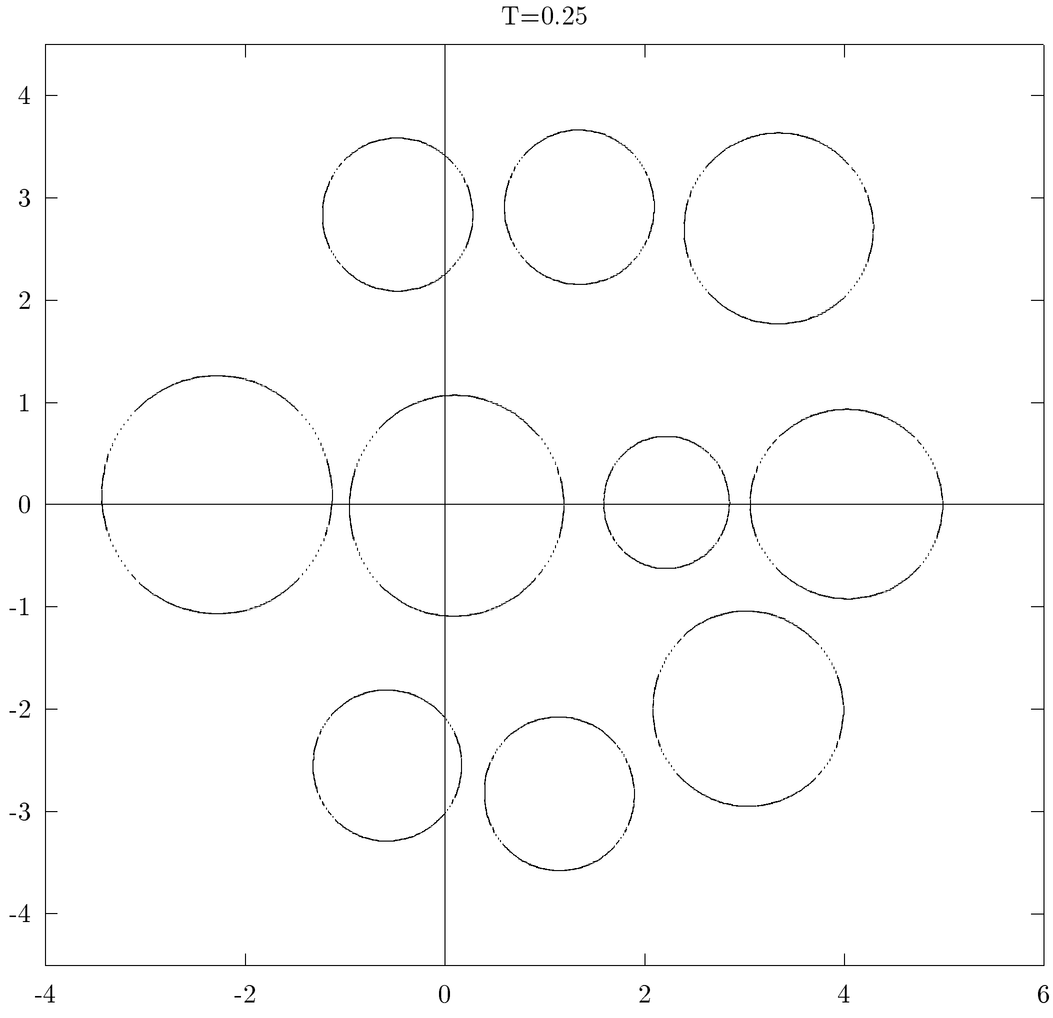


Figure 16. One larger particle versus three smaller particles, $N = 512$, with the larger particle taking mass away from all three smaller particles.



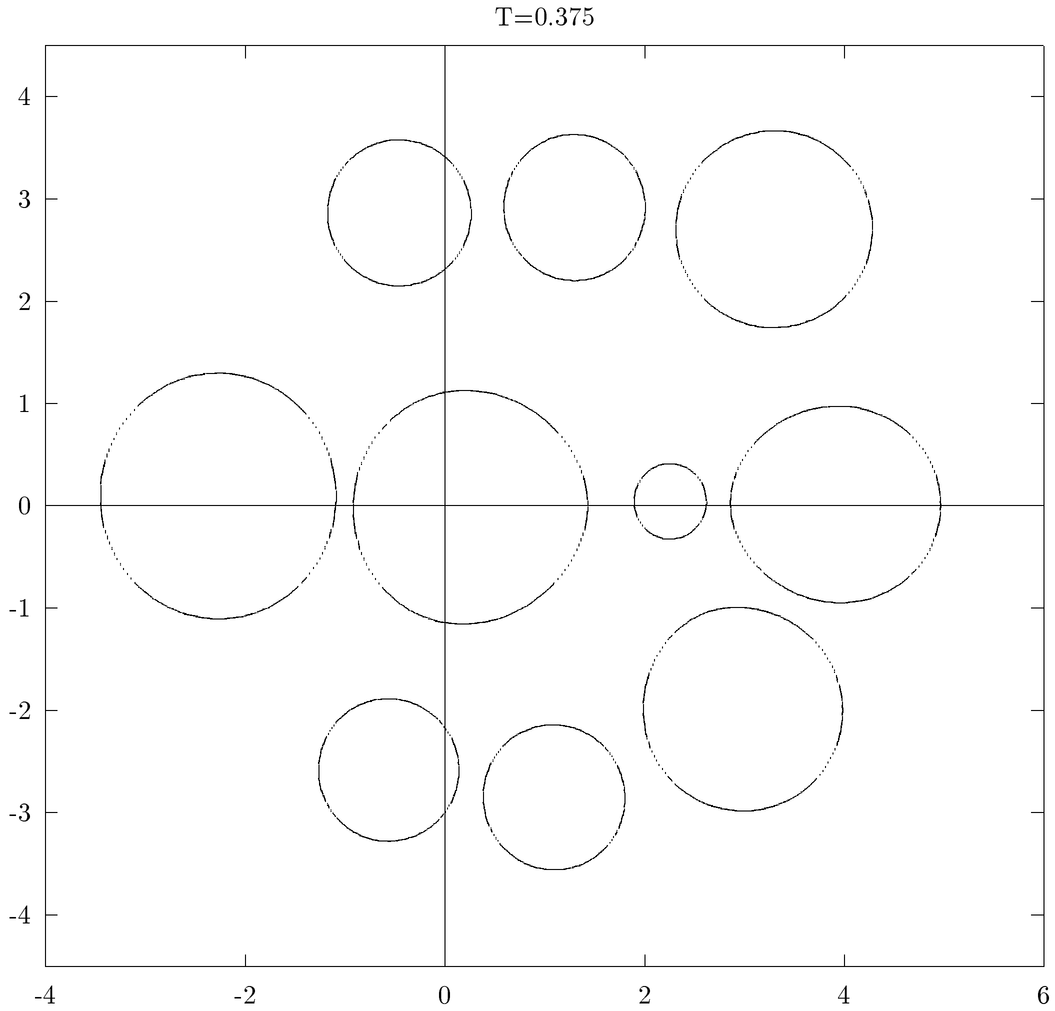
(a)

Figure 17. A ten-particle system; total $N = 1280$; (a). $t = 0$; (b). $t = 0.25$; (c). $t = 0.375$; (d). $t = 0.404$; (e). $t = 0.615$, with only 9 particles left in the system.



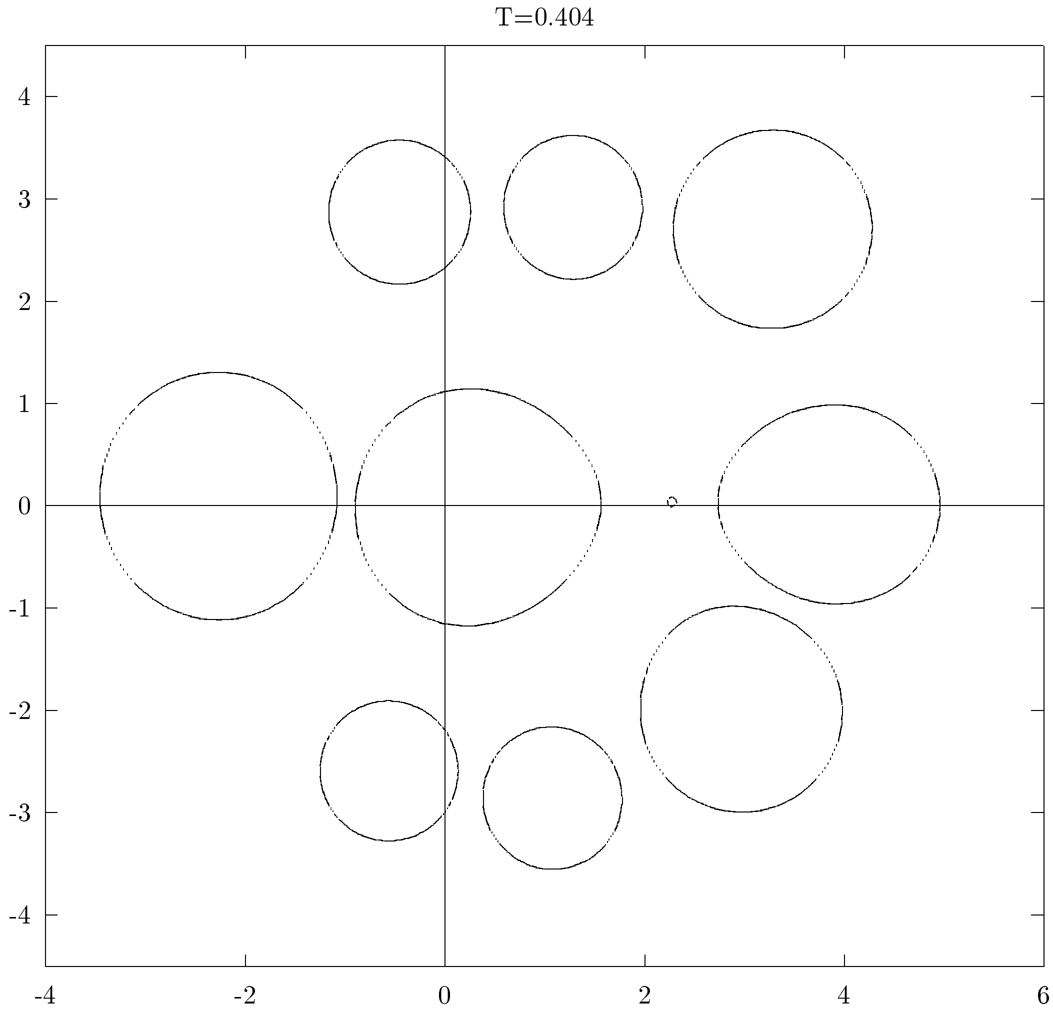
(b)

Figure 17(b).



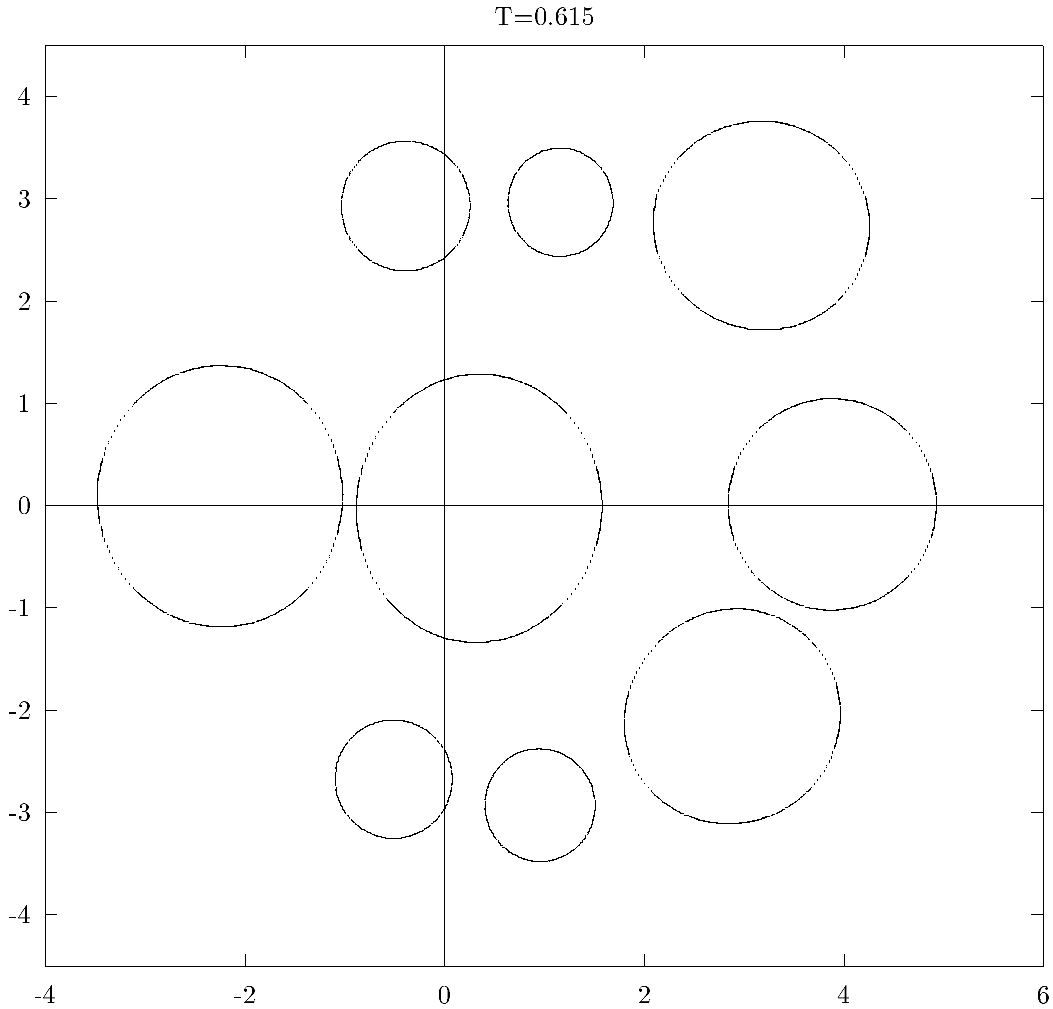
(c)

Figure 17(c).



(d)

Figure 17(d).



(e)

Figure 17(e).