$$\delta 0 := \frac{6.3 \cdot 2 \cdot 3.1415 \cdot 0.01}{2.07^2 \cdot 1.938 \cdot \beta^2}$$

$\kappa := 0.037$

$\delta 0 = 0.062$

below the problem is solved for the equal initial coordinate offsets

$$U1(\delta, t) := \frac{-\kappa}{\delta 0 - \kappa - i \cdot \delta} \cdot \left[\exp\left[-(\delta 0 - \kappa) \cdot t\right] - \exp(-i\delta \cdot t)\right]$$

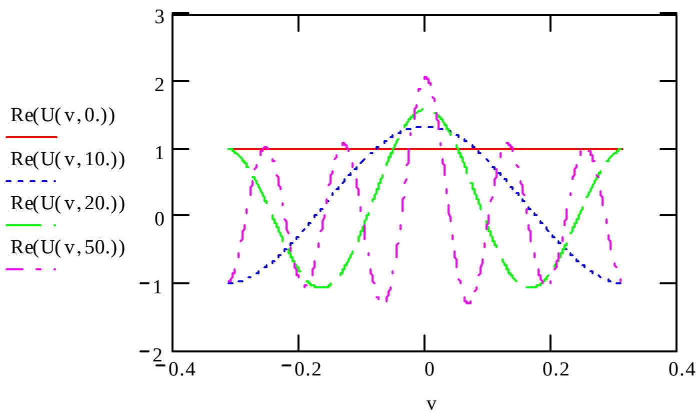
$U2(\delta, t) := \exp(-i\delta \cdot t)$

$U(\delta, t) := U1(\delta, t) + U2(\delta, t)$

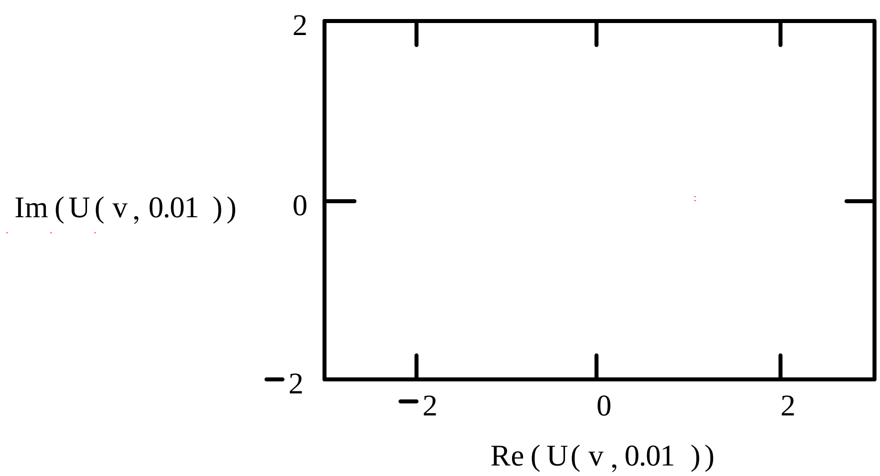
$$R(\delta, t) := \frac{d}{dt} U(\delta, t)$$

$U(1., 0.) = 1$

coordinates vs energy (v) in various times 0,1,2,5



phase space in four moments of time

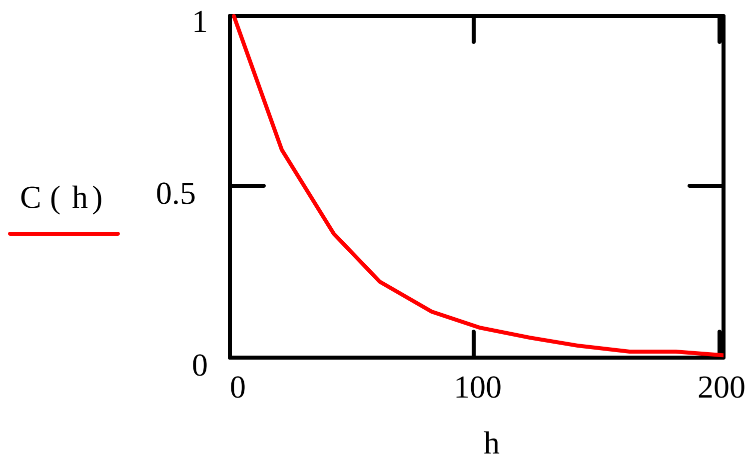


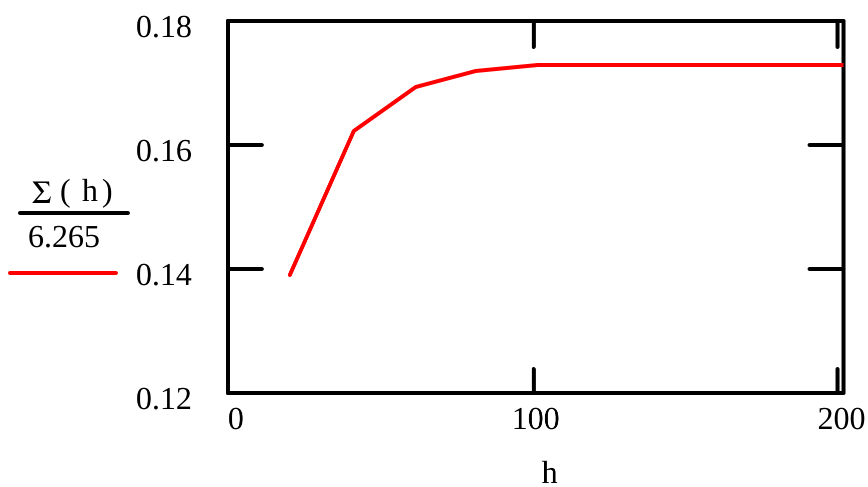
$$C(t) := \int_{-100.}^{100.} \mathrm{Re}(U(d,t)) \cdot \frac{\delta 0}{\pi \cdot \left(\delta 0^2 + d^2\right)}\, dd$$

$$\Sigma(t) := \sqrt{\int_{0.001}^{100.} \mathrm{Re}(U(d,t))^2 \cdot \frac{2 \cdot \delta 0}{\pi \cdot \left(\delta 0^2 + d^2\right)}\, dd - C(t)^2}$$

$h := 0., 20 \ldots 200.$

centroid (left) and beam size (below)





$$fr(t) := \int_{0.}^{5.} \frac{2 \cdot \delta 0}{\pi \cdot \left(\delta 0^2 + d^2\right)} \cdot \mathrm{if}\left(\left|\mathrm{Re}(U(d,t))\right| > 1.5, 1., 0.\right) dd$$

$fr(3.) = 0$

Loss of the particles at the aperture of 1.5 initial displacement