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Wavebased Micromotor for Plane Motions (3-DoF)

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Outline

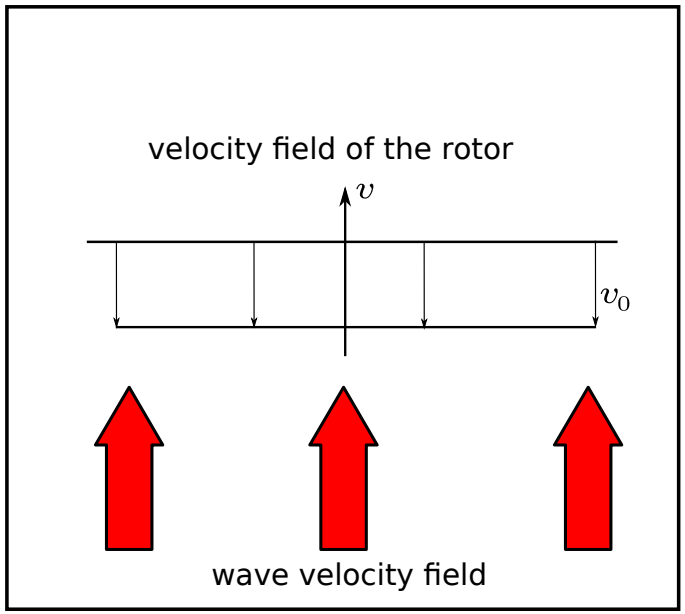
Motion induced by waves

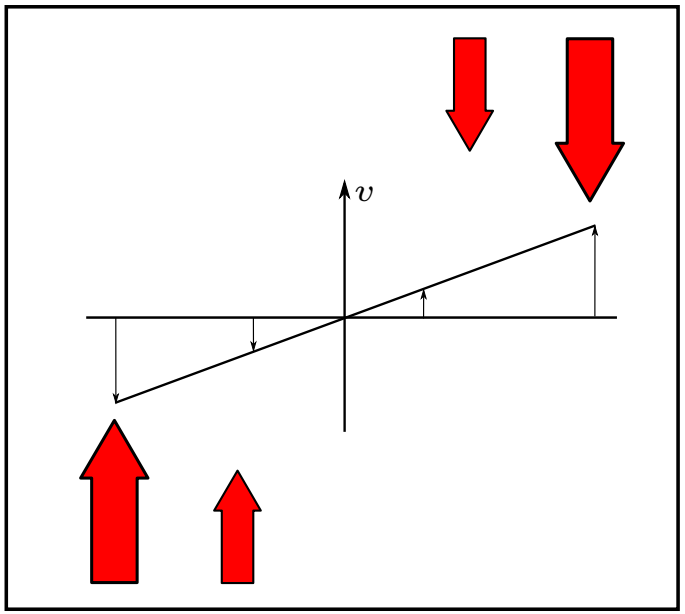
http://theosophywatch.files.wordpress.com/2009/11/surfer.jpg

sawpostioninganimatie.wmv

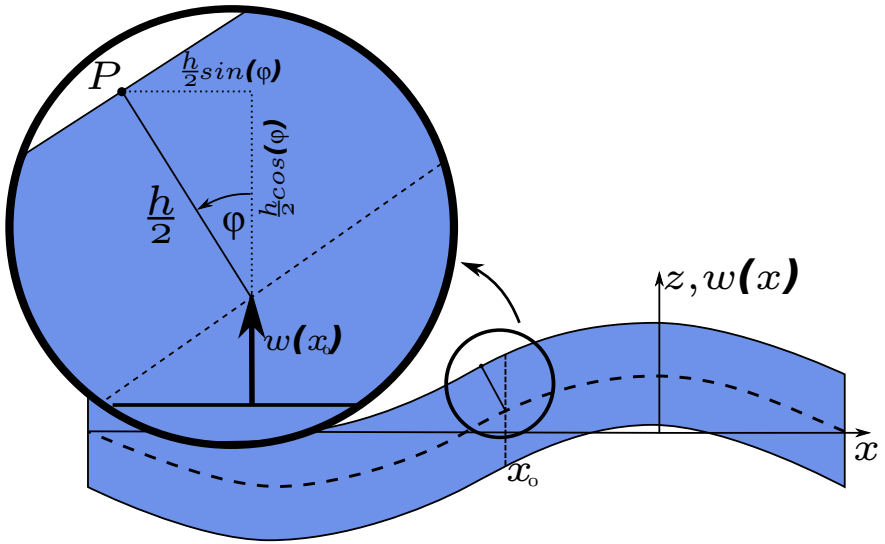
http://www.ce.utwente.nl/saw/images/sawpostioning%20animatie.wmv

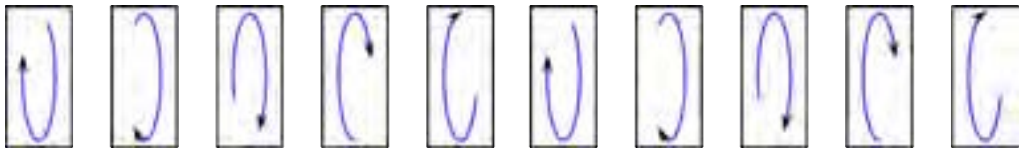
Velocity field of the linear motor





Preliminary considerations





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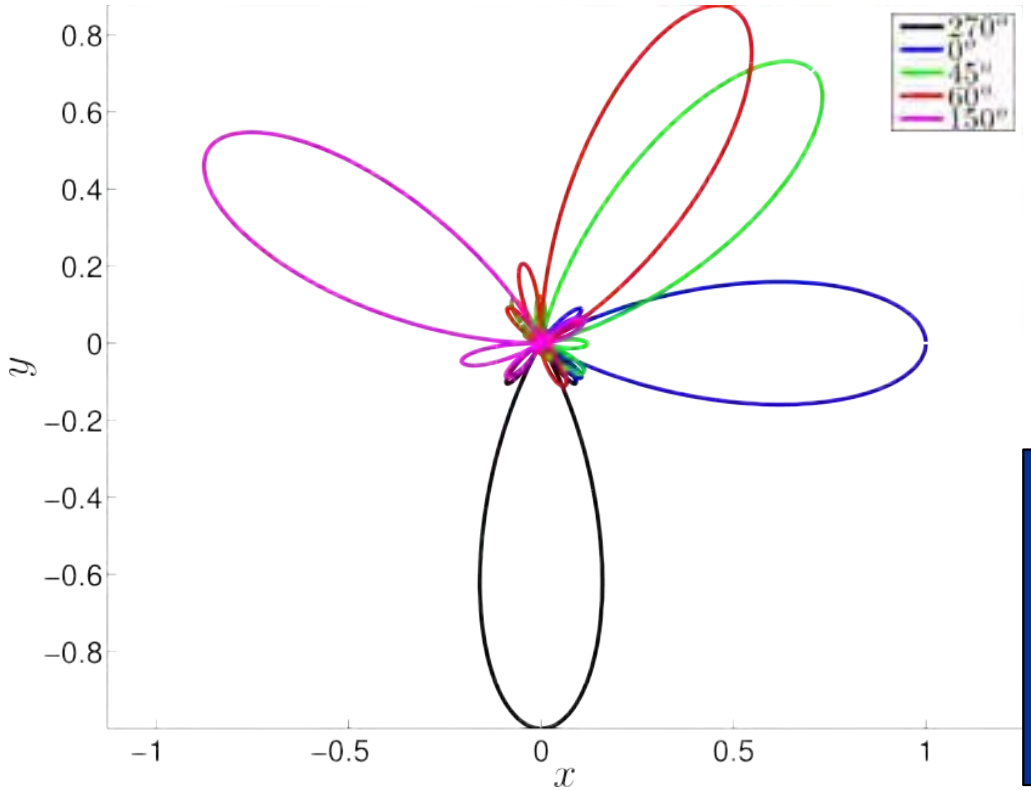

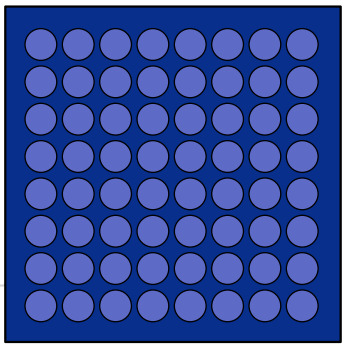

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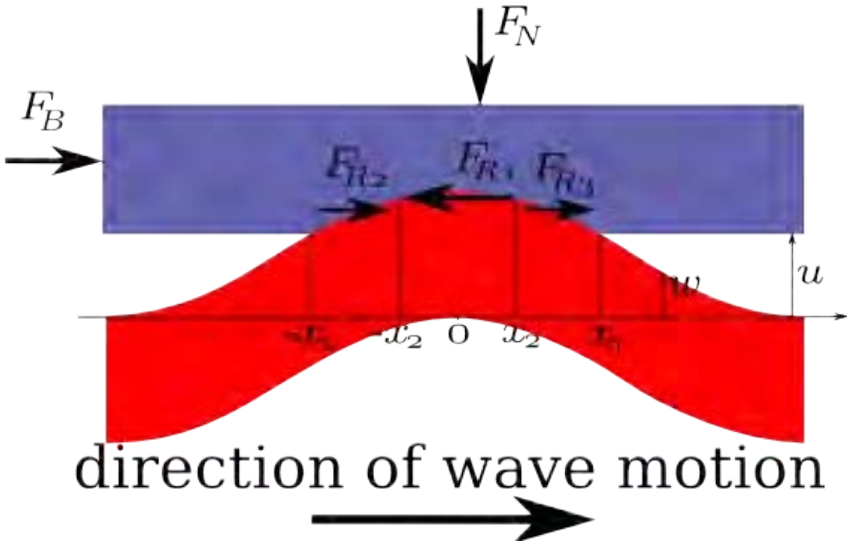
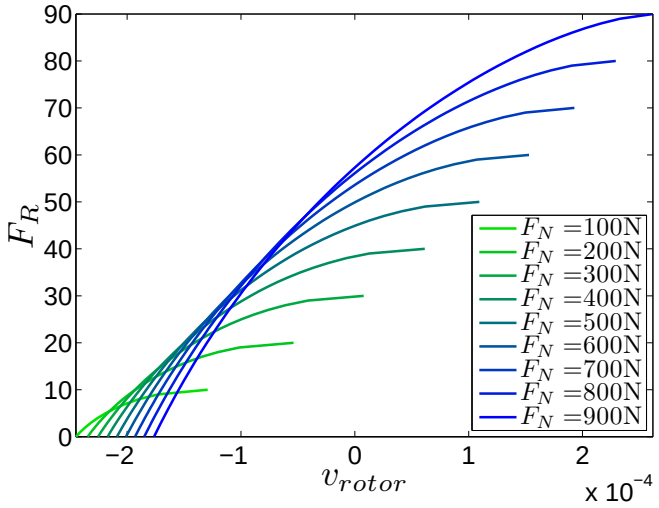
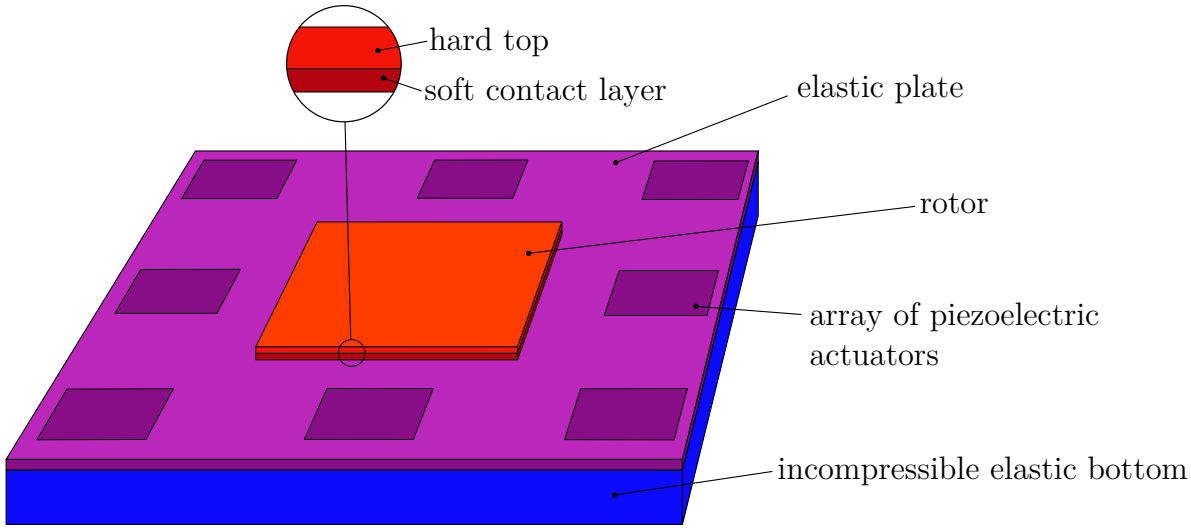




Simulations of the 3-DOF-motor



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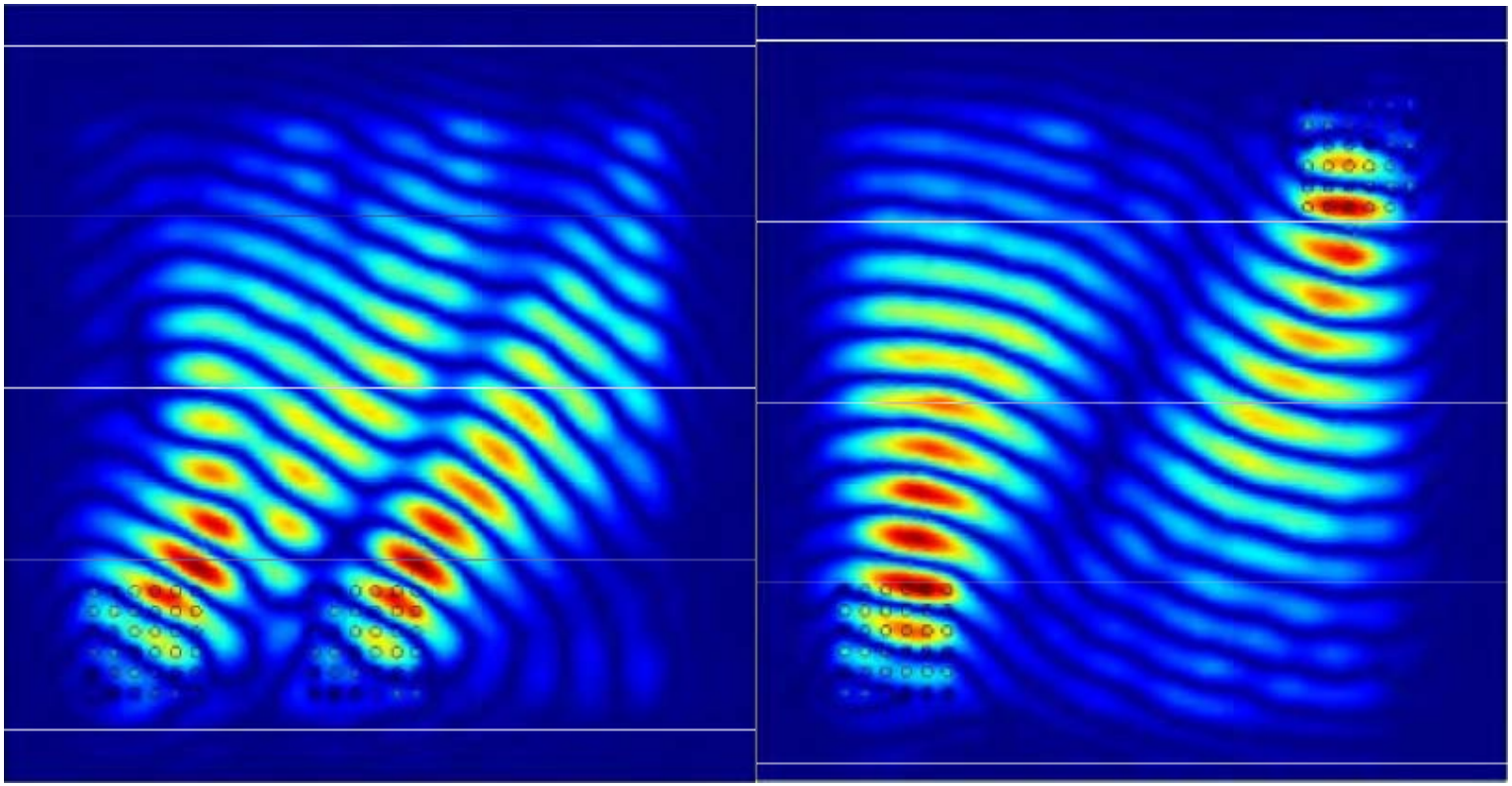
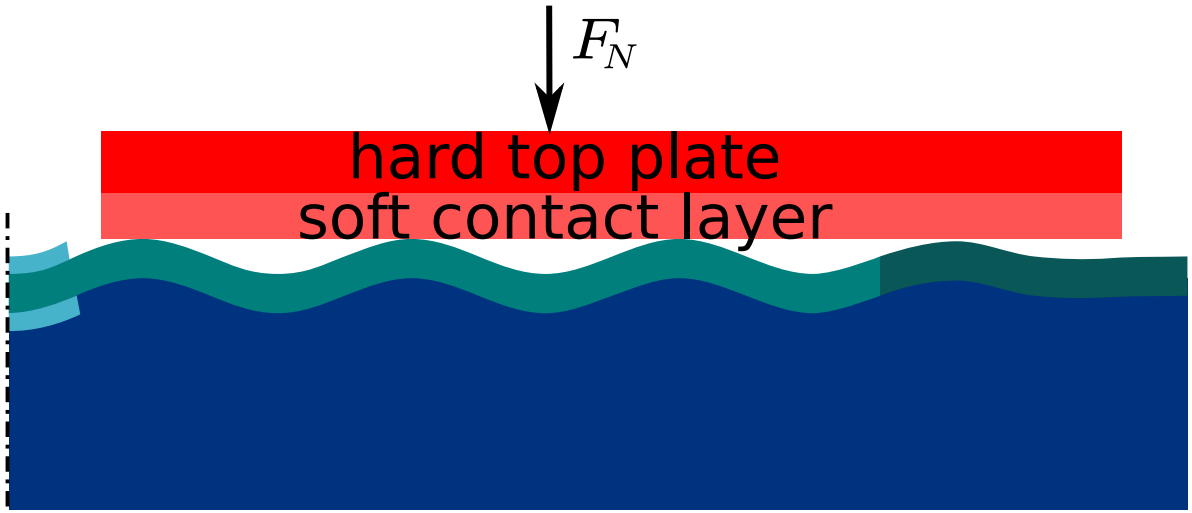
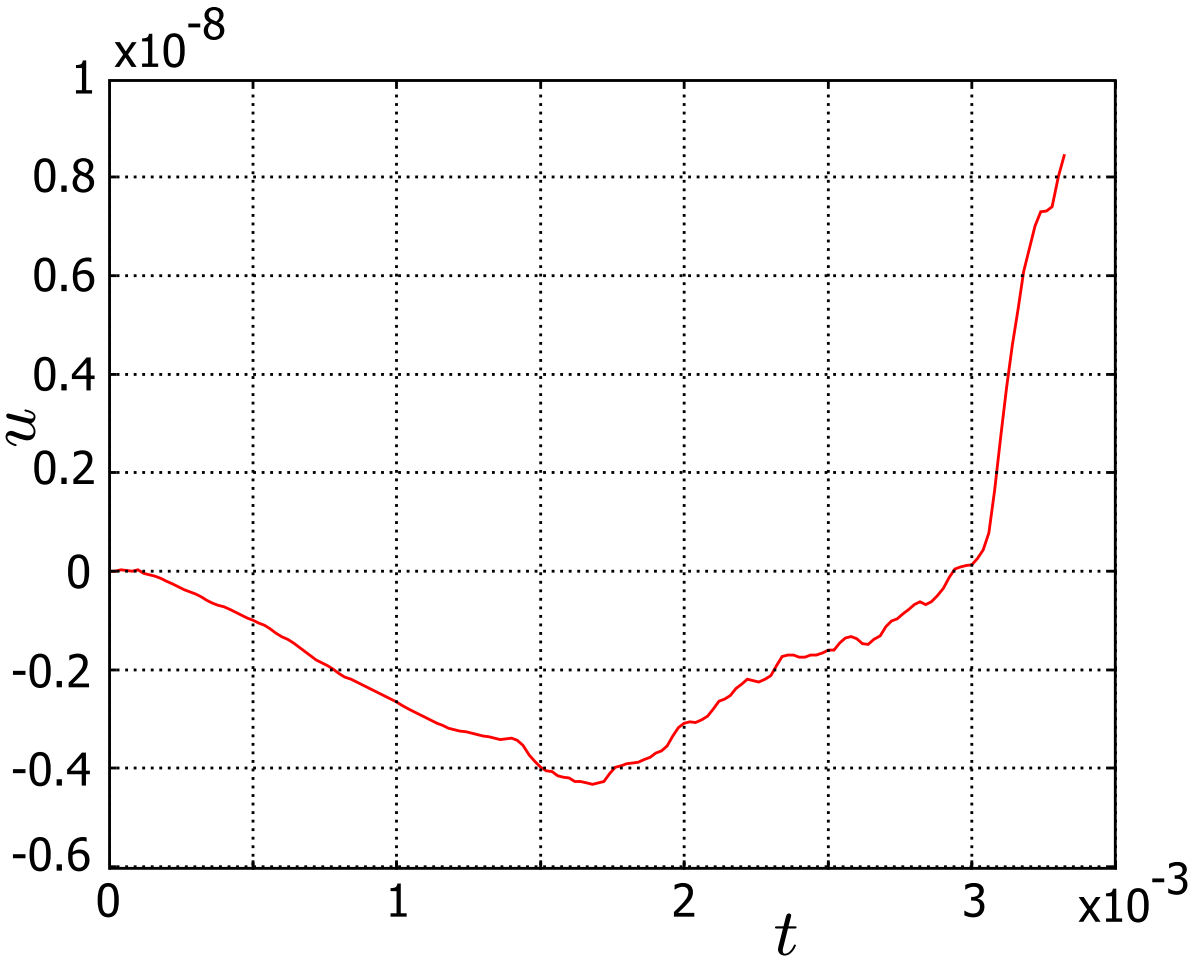


simulation without rotor: velocity field

Simulations of the 3-DOF-motor



Simulations of the 3-DOF-motor



Displacement u vs time t

Conclusions

- COMSOL is capable for computationally expensive simulations
  - transient wave propagation
  - dynamic contact
  - piezo-mechanical coupling
- motor appears feasible
  - motion by elliptic trajectories
  - steering with laws from antenna theory
  - damping at edges
- future work
  - improve numerical implementation
  - new feature: use information of reflected waves for position detection

Thank you for your attention!