D 21/04/2021

Notes

- Interpolation works now (also for periodic functions)
- Shape notes/ multishape tests complete, except for questions and convergence stuff
- Tested the 'VectorToShape' for w and when to use
- DDFT talk (maybe different example?)
- ALOP Workshop

Questions

- Reference for exact no-flux AD solution?
- Plotting single normals
- Polar Diff at $r = 0$?
- Wedge linear, quadrilateral bilinear. why?
- Algorithm writing (how to improve this)
- Loewen paper: $N = 100$ - how to translate to ρ
- Loewen V_{ext} problem: Do we do V_2 as well? Interesting $\widehat{\rho}$?
- ∇V_{ext} control 'constant' - spatial averaging?
- Is DDFT valid for $\mathbf{w}$ which is not ∇V? (see DDFT review 3.4/4.4 - need diffusion dominated flow?)

1 Separation Example

We model a separation example with the external potential

$$V_{ext} = 10 \left(\frac{r}{4\sigma} \right)^4 + \cos(2\pi t/2.75) \left(\frac{r}{\sigma} \right)^2 .$$

We choose $\rho_0 = \bar{\rho} e^{-V_{ext}}$ and $\bar{\rho} = 0.05$. The domain is $[0, 5]^2$ with $N = 30$ and $n = 60$. The time horizon is $(0, 3)$. If we define $r = |y_1|$, the solutions for $\kappa = 1$ and $\kappa = -1$ for the sedimentation equation with corresponding V_2 are displayed in Figures 1 and 2. The results for the standard overdamped equation look very similar. The external potential is shown in Figure 3. The two-dimensional problem (meaning $r = \sqrt{y_1^2 + y_2^2}$) are essentially the same.

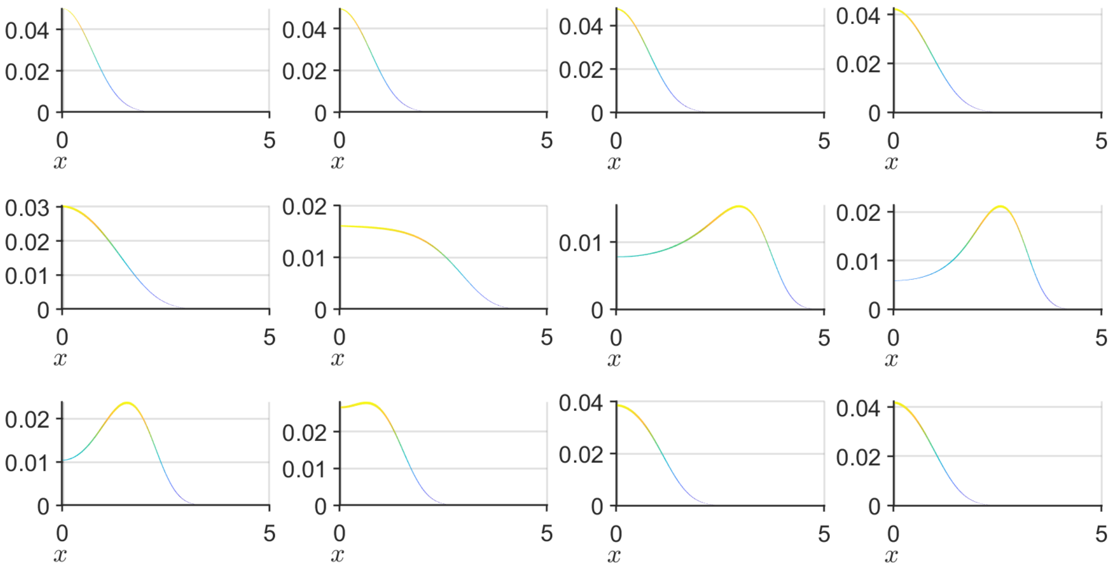

Figure 1: '1D' solutions for sedimentation, $\kappa = 1$

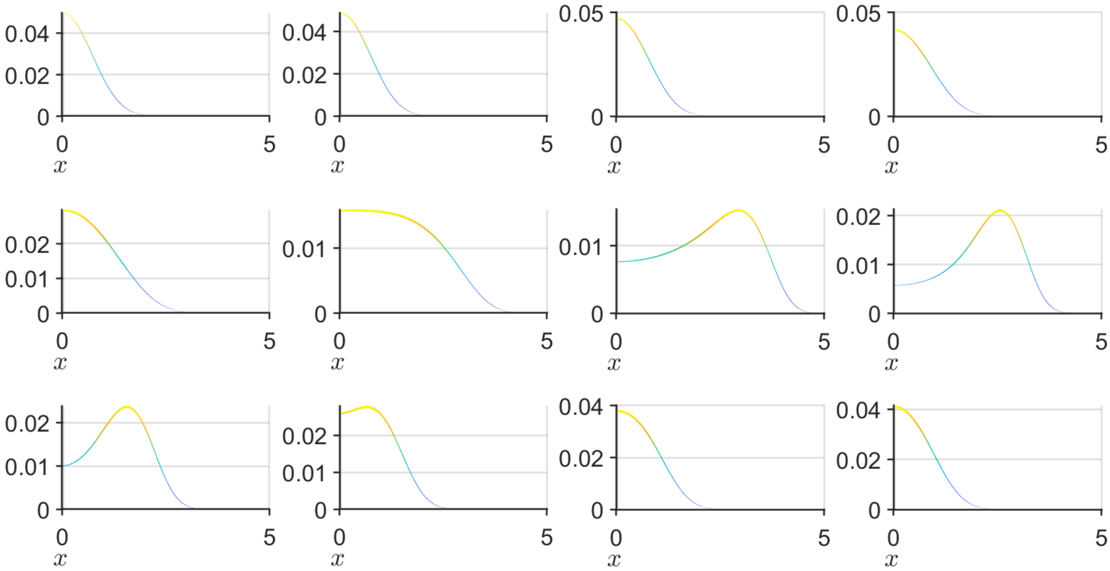

Figure 2: '1D' solutions for sedimentation, $\kappa = -1$

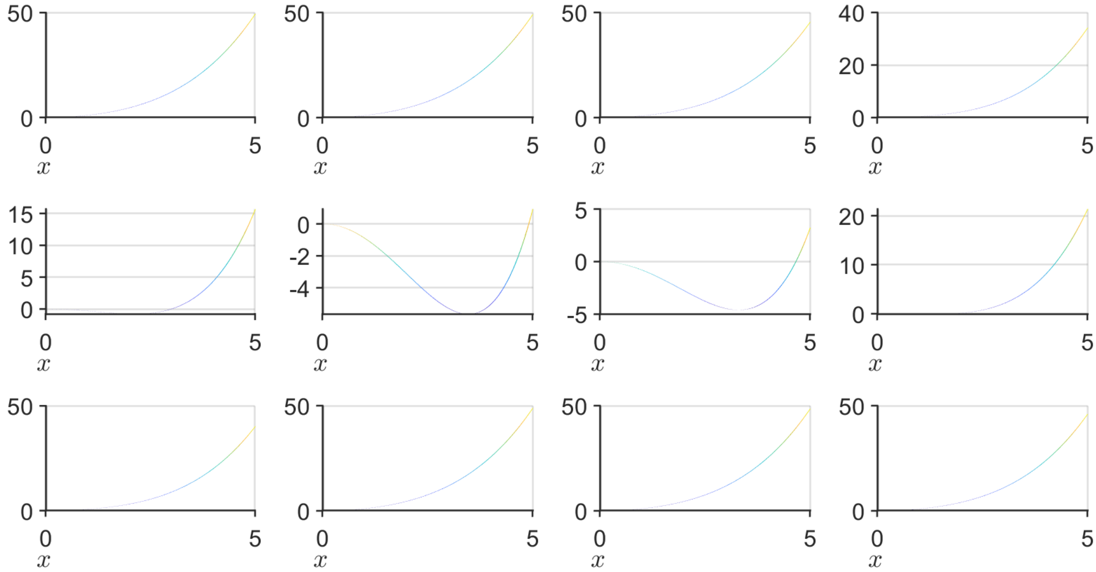

Figure 3: '1D' V_{ext}