**Summary**

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* Implemented a non-shearing DPD simulation with equations and dynamics from Pryamitsyn
  + Viscosity is calculated from the Green-Kubo formula
* Investigated variation of viscosity with:
  + Number of particles – found an increasing trend that rises rapidly near
  + Integration time – Increased viscosity since we are integrating over a longer period of time.
  + Colloid-colloid repulsion parameter – Increased viscosity as well, peaks more sharply near .

Issues

* Is the viscosity formula correct?
  + It does not appear to conform to the **empirical formula** even though Pryamitsyn and Pan have shown that it works.
  + Why is it that the viscosity function **does not rise significantly at**  and only doing so near 0.9?
  + In fact, the particles appear to be compressed significantly, causing to be possible. Because of this, **will viscosity even diverge**? It seems like it will just keep packing closer and closer. Is it no longer meaningful to investigate once there is **significant overlap**?
* Is the current **integration time** sufficient?
  + Integrating with 10x the duration indicates up to 50% increase in viscosity at and up to 2 to 3x viscosity at
* Is there a need to modify the number of water particles as we increase the number of colloidal particles to **keep pressure constant**?
  + The pressure appears to be increasing smoothly as a function of water particles / density of water particles, as is summarised in the equation of state:
* Implementing the Lees-Edwards BC + SLLOD does not give reasonable results for the viscosity.
  + Is the stress computed wrongly?
  + Are the SLLOD modifications to the EoM necessary? With the first modification that relates position to velocity, is there still a need for the velocity jump at boundaries?

Possible Areas for Investigation

* Using spheres of various sizes
* Investigating the onset of order/disorder as a function of packing fraction and shear rate
* Varying models of colloid-colloid interactions 🡪 Hertzian contact etc