Excel spreadsheet instructions

Select either the "fit lp" tab if you want to estimate the persistence length from high-frequency data or the "fixed lp" tab if you want to set the persistence length to a chosen value (you must use this tab if no high-frequency data are available).

Replace the experimental data in columns M, N, and O with your data. If estimating the persistence length from high-frequency data, make sure columns P, Q, R, and S are the same length as your experimental data.

[Note – In the spreadsheet, cells highlighted yellow are user inputs. The cells highlighted in orange are the cells to be varied by Solver. The cell with red text is the Solver target cell to be minimized. The outlined cells are the inputs for the pointer algorithm simulation input file. More details about the parameters can be found in the Pointer Algorithm User Manual.]

Part 1: Fill in the experimental parameters T [K], ϕ, η_s [Pa.s], and η_0 [Pa.s].
- The volume fraction ϕ can either be calculated separately and entered directly into cell B7 or estimated as the weight fraction in cell B6 from the surfactant concentration, molecular weight of the surfactant, and solution density.
- If the zero shear viscosity η_0 wasn't measured experimentally, it can be calculated from the loss modulus G" at low frequency from the lower plot. When taking η_0 from the lower plot, make sure that the best-fit power law is fit to the region where the slope of G" is (close to) 1.

Part 2: Fill in the rheological parameters G'_{min} [Pa], G''_{min} [Pa], and ω_{c1} [rad/s].
- G'_{min} and G''_{min} are the values of G' and G" where G" has a local minimum at intermediate frequency. If there is no local minimum in G", the options are to 1) enter G' and G" at the highest frequency available or 2) enter G' and G" at the maximum value of the ratio G'/G".

Part 3: N/A (automatically calculated)

Part 4.1: Fill in the micelle diameter d and select either B6 or B7 for the value of the volume fraction in B30.
- If you are obtaining the persistence length from high-frequency data, you must also calculate the fitting error in cell B32. To do so, find the region of G" where the slope, as calculated in column Q, is close to 0.75 and decide which part of G" you want to fit. Sum up the error (calculated in column S) of that region of G" and enter the sum in B32.

Next, run Solver. The objective is cell B38 if extracting the persistence length from high-frequency data or cell B36 if using a fixed persistence length (both are marked in red on their respective tabs). Either minimize the objective cell or set its value to 0; depending on the data

one option may work better than the other. The variable cells (highlighted orange) are the persistence length l_p and entanglement length (B25 and B26) if fitting the persistence length or just the entanglement length (B25) if using a fixed persistence length. Select the option to keep unconstrained variables non-negative and solve. If Solver doesn't converge, you can try changing the starting values for the persistence and entanglement lengths.

The remaining parts 4.2, 5, and 6 are automatically calculated. The independent micelle parameters (l_p, $\langle L \rangle$, ζ, and α) that are required for the simulation input file are outlined, but other parameters of interest like the breakage and reptation times and entanglement length can also be found in the spreadsheet.