ME 501 Homework #9, Due 4/15/2025

Read through the paper, "Detailed modeling of an isolated, ethanol droplet combustion under microgravity conditions," by Andrei Kazakov, Jordan Conley, and Frederick L. Dryer.   They model ethanol droplet combustion using a detailed approach.

1) List all of the assumptions that are used in the classical droplet problem (that we discussed in class) that are either relaxed or improved upon in the approach of Kazakov et al.   Highlight the three improvements that you think are most critical in improving the predictive ability of the model.
2) Using the classical droplet model, compare the predictions of burning rate, flame position, and flame temperature with the simulations in Figures 5, 6, and 7 at the time of 0.47s after ignition, for the 1 mm droplet burning in air.   Which parameters are similar, and which are not?