Elec3400 Tute 4: BJT Amps – HF models and analysis

1) Draw and calculate the Hybrid-pi model for the 2N3906 PNP BJT for collector currents of 1mA and 10mA. The data sheet is on the webpage.

2) Draw and calculate the Hybrid-pi models for the BC549A and BC549C NPN BJTs for a collector current of 3mA. The data sheet is on the webpage. The "C" suffix denotes a high β version. How does this affect the model? How can this property be used to advantage in circuit design?

3) A common emitter BJT amplifier was designed as a gain stage for the video amplifier in Q6, tute 3. Use the hybrid-pi model to predict the high frequency –3dB point of this stage if. Does the 2N3904 provide a better result?

4) Repeat the previous question with the collector current decreased or increased 10 times. How does the choice of collector current influence the high frequency response?

5) A PNP emitter follower was designed as the output stage of the video amplifier in Q7, tute 3. What is the high frequency response of this stage if a BC549C is used?

A selection of worthwhile problems to tackle from Hambley follow. Some test basic knowledge, some are quite difficult. If you have difficulty obtaining these, contact the lecturer, or one of the tutors.

Section 8.6: Problems D8.49, D8.50, D8.51 (p552,3)

Section 8.7: Problems D8,58 (p554)