Introduction

• Coaxial cable is a Bandwidth-limited channel, implying it cannot operate over entire range of frequency spectrum.
• Dispersion is a phenomenon of signal distortion which arises due to frequency dependence of phase velocity of signal components.

Results

• Slope of graph in Fig 4, indicates that, propagation time changes slightly at lower frequencies implying low frequency signals arrive more or less at same time, while there is a higher difference in arrival time of high frequency signals.
• It’s evident from fig 1, that higher frequency square pulse underwent severe distortion compared to lower frequency pulse.

Conclusion

• This study thus concludes that dispersion effects become significant at higher frequency ranges in electromagnetic spectrum (~100 MHz -2GHz), and places a limit on bandwidth of signal for undistorted transmission.
• The study has implications in field of RF and microwave transmission, as well as computer and instrumentation (eg: oscilloscope) data connections, dealing with high frequency signals.

References:
1. D.M. Pozar, Microwave Engineering, Addison-Wesley
2. William Hayt Jr and John A Buck, Engineering Electromagnetics, 6e/d