9.1b. As the N increase for each fixed window, the width of the main lobe decreases, which results in a decrease in the transition width between passbands and stopbands. But the side bands area remains roughly with the change in N.

9.1.c For all the window types and N values, we get Linear-phase systems as seen in the plots. The also change more rapidly in the main lobe as N increases. Also, the side lobe phases change more frequently compared to the main lobe.

9.1d

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Rectangular | Bartlett | Hamming | Hanning | Blackman |
| Main Lobe Width in terms of samples | 16 | 38 | 37 | 34 | 58 |
| Main Lobe Width in terms of frequency | 0.064\*PI | 0.152\*PI | 0.148\*PI | 0.136\*PI | 0.232\*PI |

As N Increases, width of main lobe decreases and amplitude of the side lobes remain roughly constant for a fixed window.

9.3d

Differences obtained in Magnitude and Phase Response:

N = 51 Difference = 13.25

N = 75 Difference = 13.26

N = 101 Difference = 13.27

Overall, we see that the difference is roughly the same an this is in accordance to textbook values are well