Shiv Nadar University

Department of Electrical Engineering-(SoE)

EED364: Graph Signal Processing Lab-6(Vertex- Frequency Plot)

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I. <u>Vertex-Frequency representation:</u>

- 1. Consider an unweighted path graph of 180 vertices:
 - a. Now compose the signal x(n) on the path graph by summing three signals: u_{10} restricted to the first 60 vertices, u_{60} restricted to the next 60 vertices, and u_{30} restricted to the final 60 vertices. Now plot the composed signal on the path graph (Here consider the coordinates of the path graph such a way that, the graph should look like a path).
 - b. Now design a window w(n) with the GFT coefficients as given below,

$$W^{G}(\lambda_{l}) = Ce^{-300\lambda_{l}} : |W^{G}| = 1$$

c. Now plot the spectrogram of the graph $|sx(i,k)|^2$, where

$$sx(i,k) = \langle x, w_{i,k} \rangle$$
 and

$$w_{i,k}(n) = (M_k T_i w)(n) = N u_k(n) \sum_{l=0}^{N-1} W^{G}(\lambda_l) u_l(i) u_l(n).$$