$$e_n = \begin{cases} o(n) & \Rightarrow & f_n = \Theta(n) \\ \Theta(n) & \Rightarrow & f_n = \Theta(n \log n) \\ \Theta(n^k),\ k > 1 & \Rightarrow & f_n = \Theta(n^k) \end{cases}$$