Basic Sparse Matrix Terminology

- **Matrix bandwidth** \((B)\): 
  \[ B = \max_{i \leq N} b_i \]
  where \(N\) is the order of the matrix, and \(b_i\) is the "\(i\)-th row bandwidth", i.e., the number of columns from the first nonzero component in the row to the diagonal, inclusive.

- **Matrix profile** \((P)\): 
  \[ P = \sum_{i=1}^{N} b_i \]

- **Matrix wavefront or maximum wavefront** \((W)\): 
  \[ W = \max_{i \leq N} c_i \]
  where \(c_i\) is the "\(i\)-th row wavefront", i.e., the number of active columns for row \(i\). A column \(j\) is active in row \(i\) if \(j \geq i\) and there is a nonzero component in column \(j\) with a row index \(k\) satisfying \(k \leq i\).

- **Matrix average wavefront** \((\overline{W})\): 
  \[ \overline{W} = \frac{1}{N} \sum_{i=1}^{N} c_i = \frac{P}{N} \]

- **Matrix root-mean-square (r.m.s.) wavefront** \((\hat{W})\): 
  \[ \hat{W} = \left( \frac{1}{N} \sum_{i=1}^{N} c_i^2 \right)^{\frac{1}{2}} \]
Matrix sparsity pattern for turbine disk example.