$$\Delta(n) \quad = \quad (d-1)^{n-1}(d+n-1)$$

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Since the eigenvalues of T are those values of λ which make $\det[T - \lambda I] = 0$, it follows that $\lambda_i = d-1$ for $i = 1, 2, \ldots, n-1$, $\lambda_n = d+n-1$.

Therefore , in addition to having a known explicit inverse, the matrix T has a known determinant and know eigenvalues.