

Problem for the week of February 20, 2012

Find the determinant of the following  $2n \times 2n$  matrix:

$$A = \begin{bmatrix} 1 & 2 & 1 & 1 & \cdots & 1 & 1 \\ 2 & 1 & 1 & 1 & \cdots & 1 & 1 \\ 1 & 1 & 1 & 2 & \cdots & 1 & 1 \\ 1 & 1 & 2 & 1 & \cdots & 1 & 1 \\ \vdots & \vdots & \vdots & \vdots & \ddots & \vdots & \vdots \\ 1 & 1 & 1 & 1 & \cdots & 1 & 2 \\ 1 & 1 & 1 & 1 & \cdots & 2 & 1 \end{bmatrix}.$$