We present conjectured candidates for the least perimeter partition of a disc into $N \leq 10$ regions which take one of two possible areas. We assume that the optimal partition is connected, and therefore enumerate all three-connected simple cubic graphs for each $N$. Candidate structures are obtained by assigning different areas to the regions: for even $N$ there are $N/2$ regions of one area and $N/2$ regions of the other, and for odd $N$ we consider both cases, i.e. where the extra region takes either the larger or the smaller area. The perimeter of each candidate is found numerically for a few representative area ratios, and then the data is interpolated to give the conjectured least perimeter candidate for all possible area ratios. At larger $N$ we find that these candidates are best for a more limited range of the area ratio.

For further details see the article:
Least-perimeter partition of the disc into $N$ regions of two different areas
Francis Headley, Simon Cox

This document gives the topology of the conjectured least perimeter candidates for each $N$, with a particular geometry shown for a representative area ratio $A_r$ for which it is optimal, and the range of area ratio for which we conjecture that it is optimal.

\[
\begin{align*}
N = 4 & & N = 5_{32} & & N = 5_{23} \\
\end{align*}
\]

All area ratios

\[
\begin{align*}
N = 6 & & N = 7_{43} \\
\end{align*}
\]

$A_r \leq 2.60$  \hspace{1cm} $A_r \geq 2.60$  \hspace{1cm} $A_r \leq 2.80$  \hspace{1cm} $A_r \geq 2.80$