For each paper, summarize the main contributions in a 2+1 pager which contains the following:

Topic:

Main Contributions:

Results:

Conclusion:

In addition there are specific questions that should be answer in the +1 part of the two pager.

Paper 1 [Representation of Quantum Circuits with Clifford and π/8 Gates]

Explain how the paper analyzes the computational power of this representation in comparison to other quantum circuits. Specifically, this paragraph -- "*These give an insight that the T-gate is the root of the power of quantum computing. It may be natural to expect that the research on the effect of the T-gate may lead to better understanding of why a quantum computer can efficiently compute some hard problems*" – plies a promise. Does the paper justify this promise.

Paper 2 [Optimal two-qubit circuits for universal fault-tolerant quantum computation]

The paper introduces a Normal form for the elements of the group G (the Clifford + CS group). Where is this property used in the paper?

How can the metric "volume counting" be used to define the quality of a specific synthesis algorithm?

Paper 3 [Fast and efficient exact synthesis of single qubit unitaries generated by Clifford and T gates]

Explain Fig 2 and the equivalent derivation using the method presented in this paper.

Paper 4 [Efficient decomposition of unitary matrices in quantum circuit compilers]

Explain the use of Quantum Multiplexors.

The algorithm uses either Schur matrix decomposition or eigenvalue decomposition as the former is faster for small matrices. Can you quantify this with matlab/python/C measurements to justify the 2^6 x 2^6 size boundary.