Classifying subfactors up to index 5

Emily Peters
http://euclid.unh.edu/~eep
Noah Snyder
http://math.columbia.edu/~nsnyder
joint work with Calegari, Jones, Morrison, Penneys

Shanks Workshop on Subfactors and Tensor Categories
http://euclid.uhn.edu/~eep/Shanks2010.pdf

Outline

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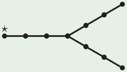
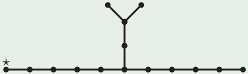
principal graphs up to $3 + \sqrt{3}$

Theorem (Haagerup, Asaeda-Haagerup, Bisch, Asaeda, Asaeda-Yasuda, Bigelow-Morrison-Peters-Snyder)

There are only three principal graphs with index in the range $(4, 3 + \sqrt{3})$*:* , , 

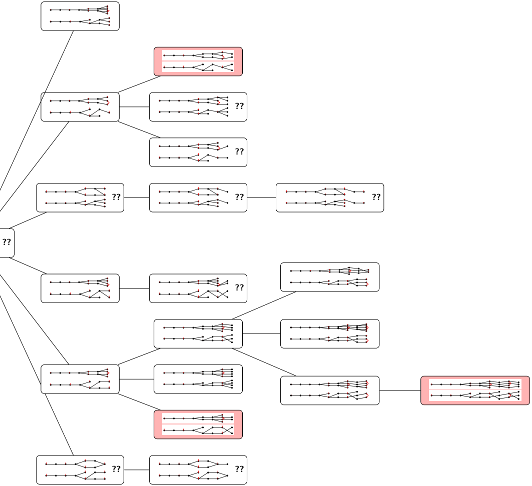
Our goal: principal graphs up to $\sqrt{5}$

Conjecture (Goodman-de la Harpe-Jones, Xu, work in progress of Calegari, Jones, Morrison, Penneys, Peters, Syder)

There are only two principal graphs with index in the range $[3+\sqrt{3}, \sqrt{5})$*:*  , 

Graphs with duals and Ocneanu-style 4-partite graphs. (I.e. we explain what the individual pictures mean.)

Running the odometer. (Talk about extending one graph vs. extending both graphs. Index bound means this is finite.)



How to actually get small lists: triple point obstruction, square test. (Don't go into much detail on each, but emphasize that they all apply independent of supertransitivity.)

The quadratic tangles attack. (Again not too much detail. Vaughan will have already talked about it. Emphasize: doesn't work when w=-1, but can work for some "weeds" not just for "vines.")

The number theory attack. (Emphasize: works for all vines.)

The cases we're stuck on. (Quadruple point with odd supertransitivity and only one leg continuing. "The Bad Seed." Emphasize that we're hopeful that QT will eventually work for the former, but we're genuinely stuck on the latter.)

Relationship to monoidal categories/fusion categories. (Implications of this for small objects in unitary categories. Fusion case. Better number theory argument for fusion case.)