

Pensieve header: Studying Chterental's $\ker(\psi)$ virtual braid.

```
In[ ]:= SetDirectory@"C:\\drorbn\\AcademicPensieve\\Projects\\OU";
<< "OU-Programs.m"
```

Loading KnotTheory` version of February 2, 2020, 10:53:45.2097.
Read more at <http://katlas.org/wiki/KnotTheory>.

From Chterental's
arXiv:1411.6313:

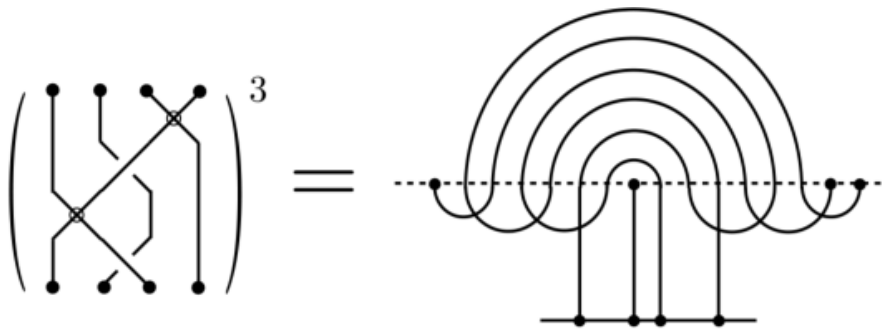
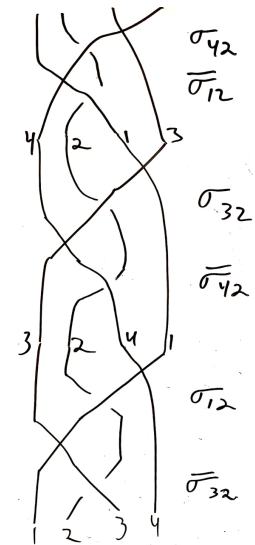


FIGURE 32. The element $(\tau_3 \sigma_2 \tau_1 \sigma_2^{-1})^3$ of $\ker(\psi : \mathcal{VB}_4 \rightarrow \text{Aut}(F_5))$.



```
In[ ]:= {b1a = VPB[4, bm[3, 2], bp[1, 2]],
         b1b = VPB[4, Sequence@@b1a[[-1 ;; 2 ;; -1]]],
         {b1c, b1d} = {b1a, b1b} /. {sigma_bar -> sigma, sigma -> sigma_bar}}
```

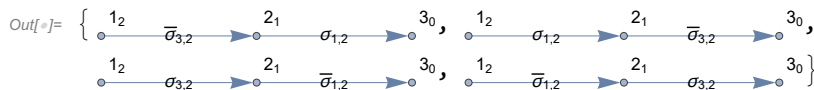
```
Out[ ]:= {VPB[4, sigma_bar[3,2], sigma[1,2]], VPB[4, sigma[1,2], sigma_bar[3,2]]}
```

```
Out[ ]:= {VPB[4, sigma[3,2], sigma_bar[1,2]], VPB[4, sigma_bar[1,2], sigma[3,2]]}
```

```
In[ ]:= F /@ {b1a, b1b, b1c, b1d}
```

```
Out[ ]:= {VD[EOS[2], EOS[5], EOS[7], EOS[8], X_-1[6, 3], X_1[1, 4]],
         VD[EOS[2], EOS[5], EOS[7], EOS[8], X_-1[6, 4], X_1[1, 3]],
         VD[EOS[2], EOS[5], EOS[7], EOS[8], X_-1[1, 4], X_1[6, 3]],
         VD[EOS[2], EOS[5], EOS[7], EOS[8], X_-1[1, 3], X_1[6, 4]]}
```

```
In[ ]:= ExtractionGraph /@ {b1a, b1b, b1c, b1d}
```



```
In[ ]:= {b3a = VPB[4, bm[3, 2], bp[1, 2], bm[4, 2], bp[3, 2], bm[1, 2], bp[4, 2]],
         b3b = VPB[4, Sequence@@b3a[[-1 ;; 2 ;; -1]]],
         {b3c, b3d} = {b3a, b3b} /. {sigma_bar -> sigma, sigma -> sigma_bar}}
```

```
Out[ ]:= {VPB[4, sigma_bar[3,2], sigma[1,2], sigma_bar[4,2], sigma[3,2], sigma_bar[1,2], sigma[4,2]], VPB[4, sigma[4,2], sigma_bar[1,2], sigma[3,2], sigma_bar[4,2], sigma[1,2], sigma_bar[3,2]]}
```

```
Out[ ]:= {VPB[4, sigma[3,2], sigma_bar[1,2], sigma[4,2], sigma_bar[3,2], sigma[1,2], sigma_bar[4,2]], VPB[4, sigma_bar[4,2], sigma[1,2], sigma_bar[3,2], sigma[4,2], sigma_bar[1,2], sigma[3,2]]}
```

In[*]:= Column[$\overline{\Gamma}$ /@ {b3a, b3b, b3c, b3d}]

VD[EOS[3], EOS[10], EOS[13], EOS[16], X₋₁[2, 8],
X₋₁[11, 4], X₋₁[14, 6], X₁[1, 5], X₁[12, 7], X₁[15, 9]]

VD[EOS[3], EOS[10], EOS[13], EOS[16], X₋₁[1, 5],
X₋₁[12, 9], X₋₁[15, 7], X₁[2, 8], X₁[11, 6], X₁[14, 4]]

Out[*]=

VD[EOS[3], EOS[10], EOS[13], EOS[16], X₋₁[1, 5],
X₋₁[12, 7], X₋₁[15, 9], X₁[2, 8], X₁[11, 4], X₁[14, 6]]

VD[EOS[3], EOS[10], EOS[13], EOS[16], X₋₁[2, 8],
X₋₁[11, 6], X₋₁[14, 4], X₁[1, 5], X₁[12, 9], X₁[15, 7]]

In[*]:= ExtractionGraph /@ {b3a, b3b, b3c, b3d}

Out[*]= { $\begin{matrix} 1_6 & 2_5 & 3_4 & 4_3 & 5_2 & 6_1 & 7_0 \\ \circ\text{-}\sigma_{3,2} & \circ\text{-}\sigma_{1,2} & \circ\text{-}\sigma_{4,2} & \circ\text{-}\sigma_{3,2} & \circ\text{-}\sigma_{1,2} & \circ\text{-}\sigma_{4,2} & \circ \end{matrix}$, $\begin{matrix} 1_6 & 2_5 & 3_4 & 4_3 & 5_2 & 6_1 & 7_0 \\ \circ\text{-}\sigma_{4,2} & \circ\text{-}\sigma_{1,2} & \circ\text{-}\sigma_{3,2} & \circ\text{-}\sigma_{4,2} & \circ\text{-}\sigma_{1,2} & \circ\text{-}\sigma_{3,2} & \circ \end{matrix}$,
 $\begin{matrix} 1_6 & 2_5 & 3_4 & 4_3 & 5_2 & 6_1 & 7_0 \\ \circ\text{-}\sigma_{3,2} & \circ\text{-}\sigma_{1,2} & \circ\text{-}\sigma_{4,2} & \circ\text{-}\sigma_{3,2} & \circ\text{-}\sigma_{1,2} & \circ\text{-}\sigma_{4,2} & \circ \end{matrix}$, $\begin{matrix} 1_6 & 2_5 & 3_4 & 4_3 & 5_2 & 6_1 & 7_0 \\ \circ\text{-}\sigma_{4,2} & \circ\text{-}\sigma_{1,2} & \circ\text{-}\sigma_{3,2} & \circ\text{-}\sigma_{4,2} & \circ\text{-}\sigma_{1,2} & \circ\text{-}\sigma_{3,2} & \circ \end{matrix}$ }