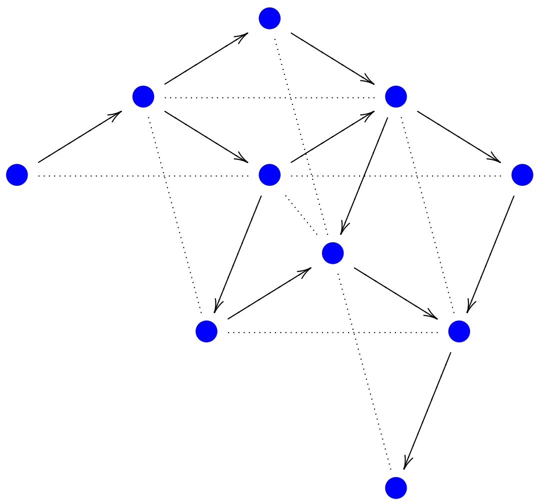
On Derived Equivalences of Simplices, Prisms and Boxes

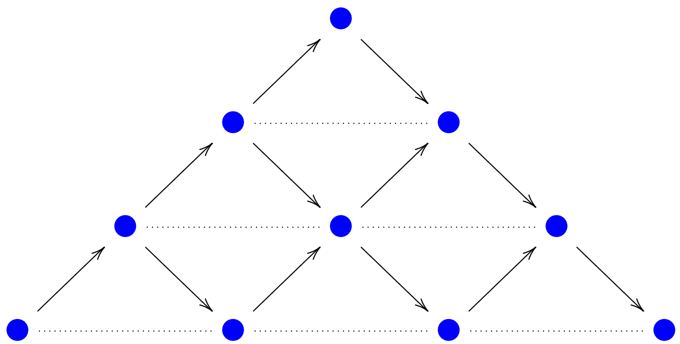
Sefi Ladkani

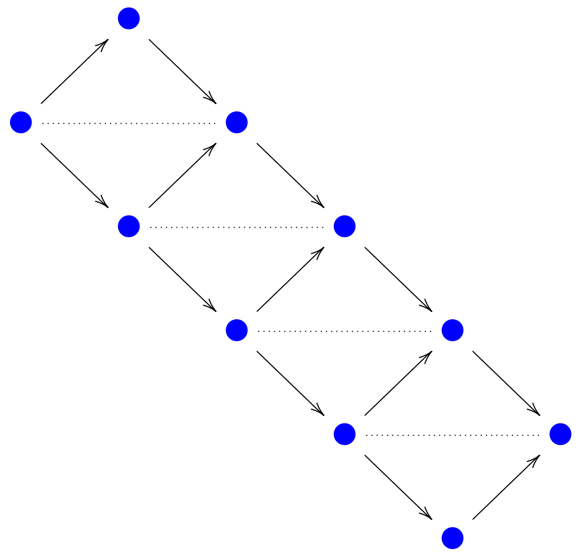
Max-Planck-Institute for Mathematics, Bonn

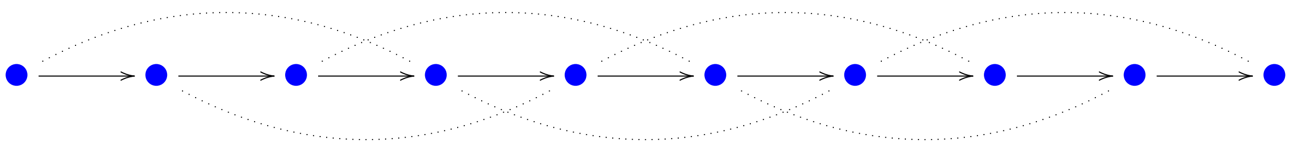
http://guests.mpim-bonn.mpg.de/sefil/

What is the connection between . . .



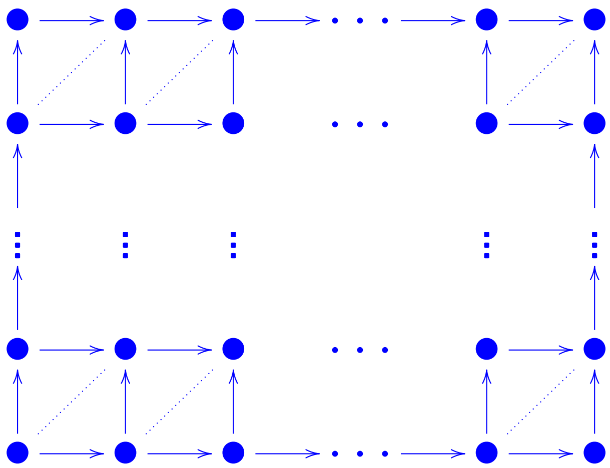




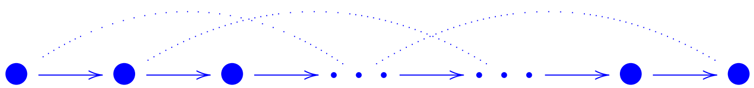


Derived equivalence of rectangles and lines

$$k(\overrightarrow{A_n} \times \overrightarrow{A_r}) \sim A(r \cdot n, r+1)$$



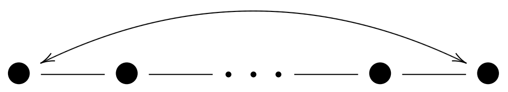
$\sim$

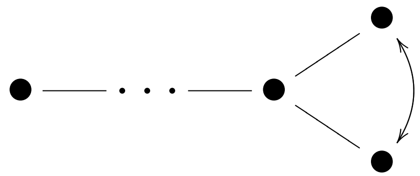


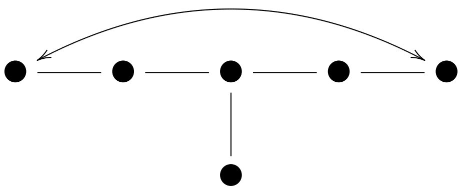
Stable Auslander algebras of Dynkin quivers

Dynkin diagrams admitting a symmetric orientation:

Diagram	*Derived type*	*CY-dimension*
A_{2n+1}	$A_{2n+1} \times A_n$	$\frac{4n-2}{2n+2} = \frac{2n}{2n+2} + \frac{n-1}{n+1}$
D_{2n}	$D_{2n} \times A_{2n-2}$	$\frac{4n-5}{2n-1} = \frac{2n-2}{2n-1} + \frac{2n-3}{2n-1}$
D_{2n+1}	$D_{2n+1} \times A_{2n-1}$	$\frac{8n-6}{4n} = \frac{4n-2}{4n} + \frac{2n-2}{2n}$
E_6	$E_6 \times A_5$	$\frac{18}{12} = \frac{10}{12} + \frac{4}{6}$
E_7	$E_7 \times A_8$	$\frac{15}{9} = \frac{8}{9} + \frac{7}{9}$
E_8	$E_8 \times A_{14}$	$\frac{27}{15} = \frac{14}{15} + \frac{13}{15}$

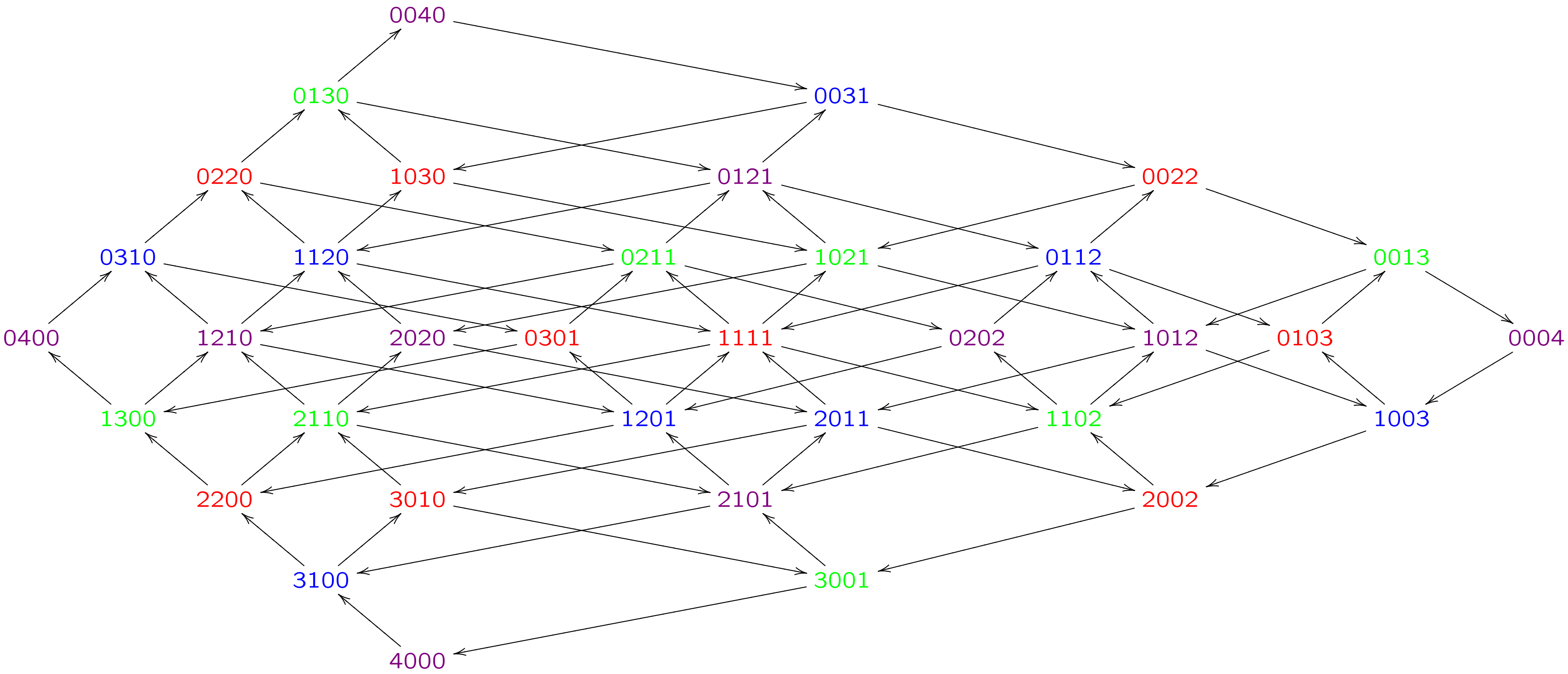






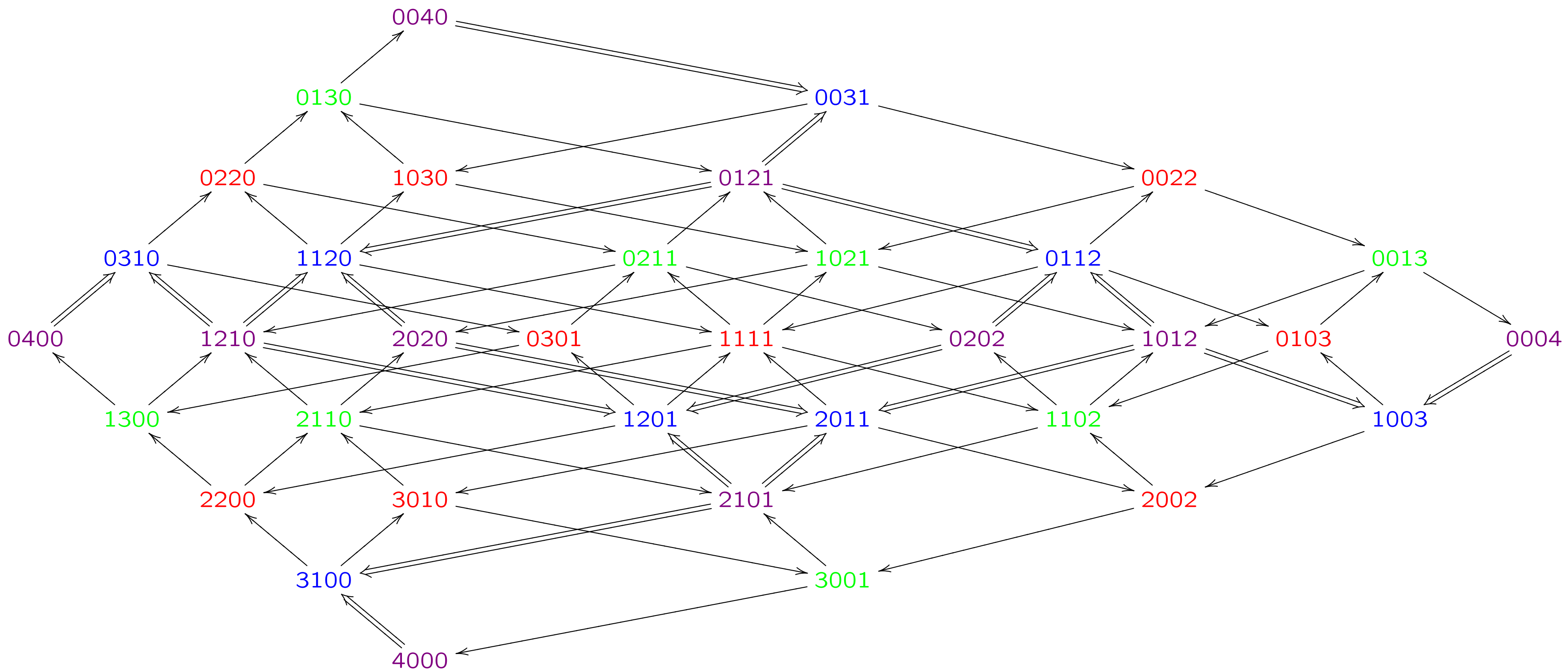
Simplices

$Q^{3,5}$

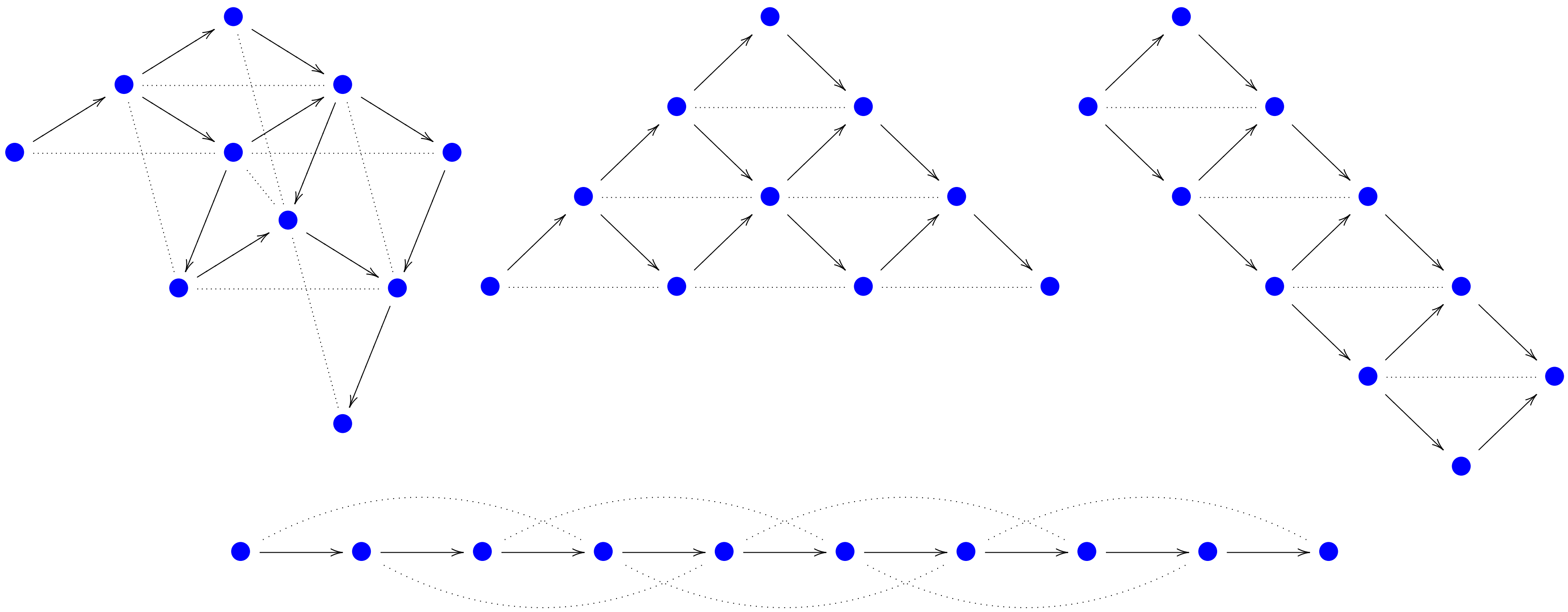


Existence of homogeneous $\Lambda_C^{n-1,s+1}$ when $n \mid s$

$\Lambda_C^{3,5}$ $\quad n = s = 4$



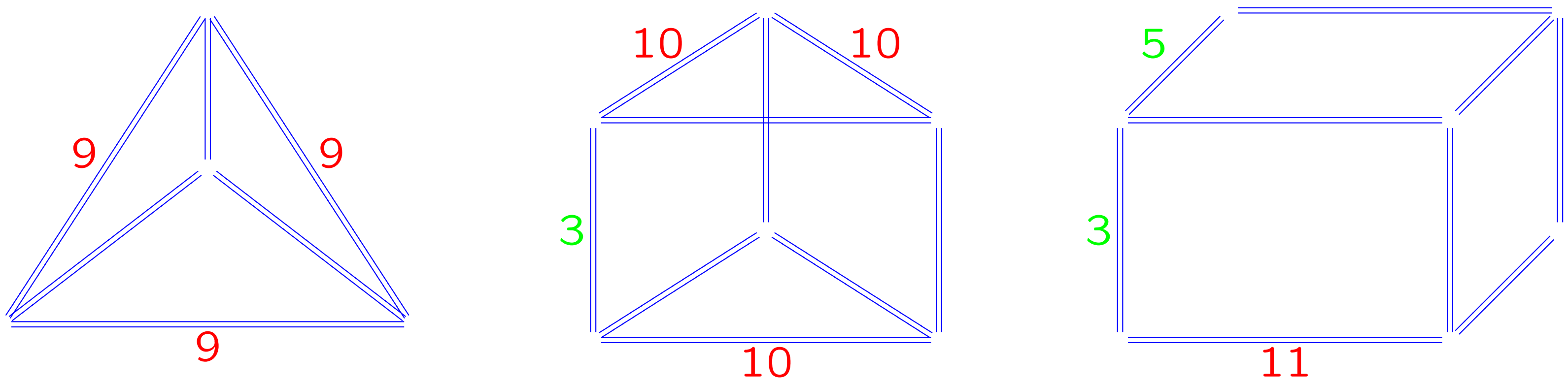
...derived equivalent pyramid, triangle, rectangle and line



$$\Lambda^{3,3} \sim \Lambda^{2,4} \sim k\,(A_2 \times A_5) \sim A(10,3)$$

Derived equivalent simplices, prisms and boxes

$$\Lambda^{3,9} \quad \sim \quad kA_3 \otimes \Lambda^{2,10} \quad \sim \quad kA_3 \otimes kA_5 \otimes \Lambda^{1,11}$$



$$\Lambda^{n,s} \sim kA_{\frac{s}{n}} \otimes \Lambda^{n-1,s+1} \qquad n \mid s$$

$$\Lambda^{n,s-n} \sim k\left(A_{\frac{s}{n}-1} \times A_{\frac{s}{n-1}-1} \times \cdots \times A_{\frac{s}{2}-1} \times A_{s-1}\right) \qquad 1,2,\ldots,n \mid s$$