

# Evaluation of Bianchi Rigid Meromorphic Cocycles at Big ATR Points

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  - ▶  $j: Y_0(1) := \text{SL}_2(\mathbb{Z}) \backslash \mathcal{H} \rightarrow \mathbb{C}$  and  $Y_0(1) =$  modular curve
  - ▶  $\tau \in F$  imaginary quadratic  $\rightsquigarrow E_\tau$  has CM by  $F$
  - ▶ CM theory: then  $E_\tau$  is defined over  $H/F$  finite abelian  $\rightsquigarrow j(\tau) \in H$
- Generalization to orthogonal Shimura varieties
  - ▶ Algebraic, defined over a number field, equipped with CM points
  - ▶ Certain meromorphic functions are algebraic at CM points
- Conjectural extension to  $\tau \in F$  real quadratic (Darmon-Vonk '21)
  - ▶  $j \in H^0(\text{SL}_2(\mathbb{Z}), \mathcal{M}(\mathcal{H})^\times)$  but  $j(\tau)$  makes no sense for real  $\tau$
  - ▶ Key idea:  $\mathcal{H} \rightsquigarrow \mathcal{H}_p := \mathbb{C}_p \setminus \mathbb{Q}_p$  and  $\text{SL}_2(\mathbb{Z}) \rightsquigarrow \text{SL}_2(\mathbb{Z}[\frac{1}{p}])$
  - ▶ Problem:  $H^0(\text{SL}_2(\mathbb{Z}[\frac{1}{p}]), \mathcal{M}(\mathcal{H}_p)^\times) = \mathbb{C}_p^\times$
  - ▶ Solution:  $H^1(\text{SL}_2(\mathbb{Z}[\frac{1}{p}]), \mathcal{M}(\mathcal{H}_p)^\times)$  **rigid meromorphic cocycles**
- Darmon-Gerhmann-Lipnowski: RMC on general orthogonal gps.

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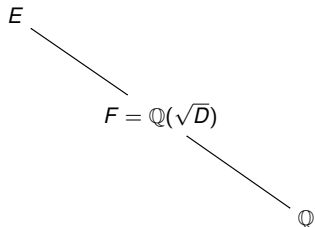
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- In these cases  $\gamma_\tau \in \text{SL}_2(\mathbb{Z}) \subseteq \text{SL}_2(\mathcal{O}_K)$ 
  - ▶ Simplifies the computations: only  $J(0, \infty)$  needed

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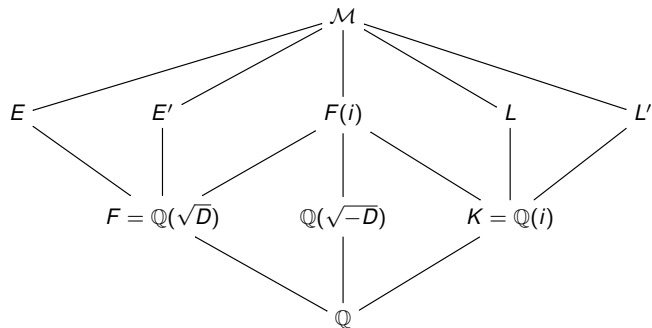
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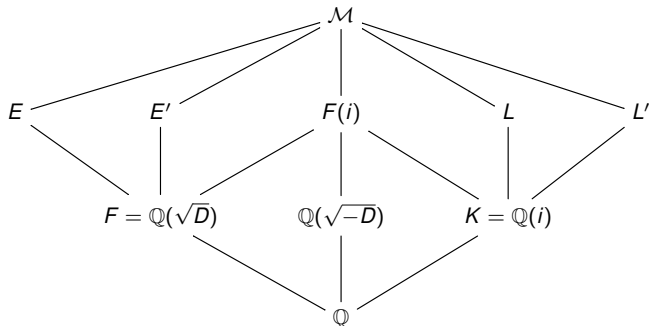
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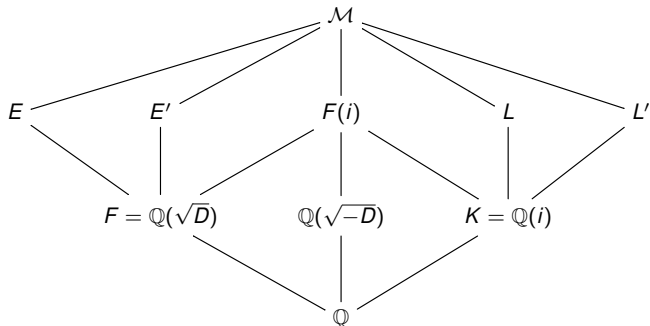
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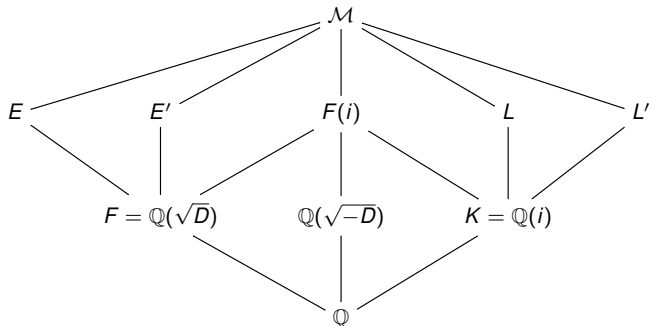
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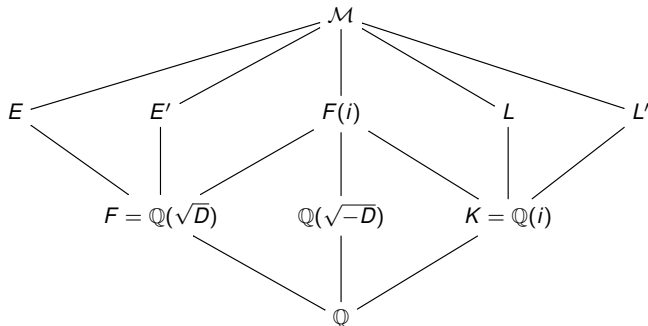
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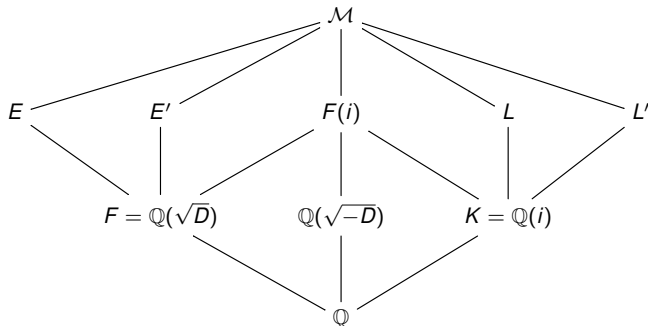
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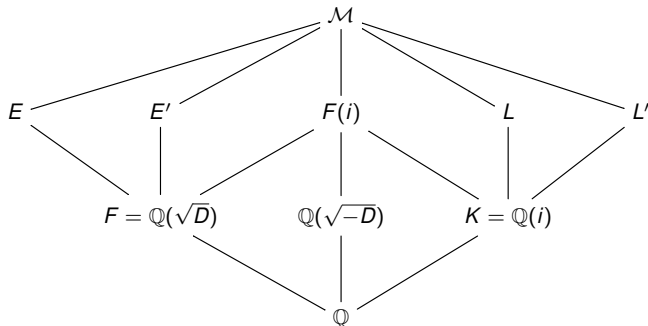
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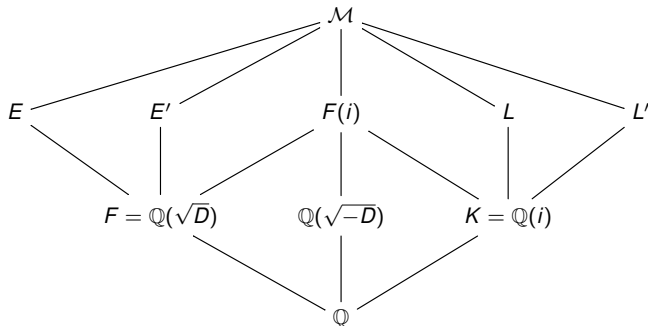
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# Evaluation of Bianchi Rigid Meromorphic Cocycles at Big ATR Points

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Aveiro 2026