Vertex operator algebras
whose dimensions of weight one spaces are 8 and 16

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We classify (strongly regular) vertex operator algebras (VOAs) V of CFT type, whose spaces generated by characters are equal to spaces solutions of *monic* modular linear differential equations of third order, which have two parameters; *expected* central charge c and conformal weight. Among VOAs with these properties, we focus on one, such that the weight one space V_1 is 8 or 16-dimensional, respectively, since VOAs which have a non-trivial automorphism with a fixed point have such dimensions. The typical examples of such VOAs are lattice VOAs associated with the $\sqrt{2}E_8$ lattice for $c = 8$ and the Barnes-Walls lattice (denoted by Λ_{16}) for $c = 16$, respectively. This is because central charges and $\dim V_1$ of *lattice* VOAs are equal to ranks of the corresponding lattices.

Of course, we could study VOAs with central charge 8 and 16, which is certainly more natural. However, it is would be (was) not easy to characterize such VOAs since there exist solutions that are independent of one of two parameters. If the character of V is free of a parameter, we cannot determine expected central charge. We may consider the characters of V-modules, in fact we did try to figure out $c = 8$ and 16 cases. But it was not very successful since first coefficients of V-modules are not always 1. (In our method this property is crucial.) First we have shown that VOAs whose space of characters in our interest is equal to one of the $\sqrt{2}E_8$ lattice VOA for $\dim V_1 = 8$ and one of the Barnes-Walls lattice VOA $V_{\Lambda_{16}}$ for $\dim V_1 = 18$, respectively. Moreover, we showed that V is isomorphic to $V_{\sqrt{2}E_8}$ for $c = 8$ under a mild condition. We expect the same as for $c = 16$.

I will certainly use a *black board* instead of slides, and promise that I will finish my talk in 60 minutes (except discussions).