Degenerations of complex associative algebras of dimension three

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Let $\mathbf{\Lambda}_3(\mathbb{C})$ $(= \mathbb{C}^{27})$ be the space of structure vectors of 3-dimensional algebras over $\mathbb{C}$ considered as a G-module via the action of $G = \mathrm{GL}(3, \mathbb{C})$ on $\mathbf{\Lambda}_3(\mathbb{C})$ 'by change of basis'. We determine the complete degeneration picture inside the algebraic subset $\mathcal{A}_3^s$ of $\mathbf{\Lambda}_3(\mathbb{C})$ consisting of associative algebra structures via the corresponding information on the algebraic subsets $\mathcal{L}_3$ and $\mathcal{J}_3$ of $\mathbf{\Lambda}_3(\mathbb{C})$ of Lie and Jordan algebra structures respectively. This is achieved with the help of certain G-module endomorphisms ϕ_1, ϕ_2 of $\mathbf{\Lambda}_3(\mathbb{C})$ which map $\mathcal{A}_3^s$ onto algebraic subsets of $\mathcal{L}_3$ and $\mathcal{J}_3$ respectively.

This is a joint work with Nataliya M. Ivanova

References

[1] N.M Ivanova and C.A. Pallikaros. Degenerations of complex associative algebras of dimension three via Lie and Jordan algebras. arXiv:2212.10635.