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Rotating shells, non-spherical gravitational collapse and cosmic censorship

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The study of gravitational collapse is a subject of great importance, either from an astrophysical, fundamental or holographic point of view. In this respect, exact solutions can be very helpful but known examples are scarce, especially when considering dynamical processes with rotation. I will identify a convenient setup in which gravitational collapse of rotating matter shells can be addressed with analytic tools, at the expense of going to higher dimensions and considering equal angular momenta spacetimes. The framework for such exact studies is developed, relying on the thin shell formalism. I will then discuss applications of this machinery to confrontations of the weak cosmic censorship conjecture and to constructions of stationary solutions describing matter around rotating black holes.