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Feedback Control of Pattern Formation LIAM STANTON, ALEXANDER GOLOVIN, Northwestern University — Pattern formation in Rayleigh-Benard and Marangoni convection is often modeled by the real Swift-Hohenberg (SH) equation. Global feedback control of these spatially-regular patterns described by the SH equation is studied. Two cases are considered: (i) the effect of control on the competition between roll and hexagonal patterns; (ii) the suppression of sub-critical instability by feedback control. In case (i), it is shown that control can change the stability boundaries of hexagons and rolls as well as stabilize mixed-mode (non-equilateral hexagon) patterns. Transitions between up- and down-hexagons are also observed. In case (ii), the feedback control can suppress the unbounded solutions of the sub-critical SH equation and lead to the formation of spatially-localized patterns.

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