Given a ring and a locally finite poset, an incidence loop or poset loop is obtained from a new and natural extended convolution product on the set of functions mapping intervals of the poset to elements of the ring. The original motivation comes from algebra loops, whose character theory fuses the characters of groups of unipotent matrices to a less drastic extent than the fusion leading to supercharacters. Algebra loops are the incidence loops of finite chains.

The focus lies on the interplay between properties of the ring, the poset, and the loop. The annihilation structure of the ring and extremal elements of the poset determine commutative and associative properties of elements of the loop. Nilpotence of the ring and height restrictions on the poset force the loop to become associative, or even commutative. Constraints on the appearance of nilpotent groups of class 2 as poset loops are given. The main result shows that the incidence loop of a poset of finite height is nilpotent, of nilpotence class bounded in terms of the height of the poset. (Received January 13, 2014)