Analysis and comparison of modern methods of turf irrigation, verifying the capability of existing information systems through the use of numerical modeling

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The automated irrigation of parks and gardens in public areas has become more and more a common practice due to the many benefits it brings in terms of improving the quality of urban green areas.

Since this practice requires significant volumes of water, and this becomes increasingly scarce and expensive, it is necessary that the design criteria and use management aim at maximizing the irrigation efficiency.

There are conflicting relationship and competition between trees and turf for several reasons. On one hand the different irrigation needs can cause excess water in the root zones of the trees, on the other hand the surface roots of trees and the shade created from the leaves by the dripline (projection line of the canopy) determine an unfavorable area to the growth of the turf because of light factor.

It follows that for an optimal design of an irrigation system is necessary to separate the turf areas from trees, with the disadvantage of considerably complicate the geometries of the sprinklers.

Each tree or group of trees need to be associated to a not irrigated area. This problem seems not to have a specifically bibliographical evidence, although there are operating standards primarily used to define buffer zones for trees from constructions (British Standard 5837:2005).

Ideally, a high number of sprinklers is required to follow the shape of the areas perfectly. Hence, an additional step is necessary to simplify these geometries, identifying a correct scheme for the sprinkler spacing.

Such a sequence of geometric operations has been tested on the "Indro Montanelli" park in Milan, obtaining a reduction of the irrigated area of 47% and a water saving of around 30%.

We intend to continue the research applying the model to other parks, verifying its applicability in different situations.