Figure 1: Key to symbols: $X =$ positives (‘ground truth’), $\bar{X} =$ negatives (‘ground truth’), $Y =$ predicted positives, $TP =$ true positives, $TN =$ true negatives, $FP =$ false positives and $FN =$ false negatives.

**Theorem 1.** In a one-class segmentation problem the Sørensen-Dice coefficient ($DSC$) and the $F_1$ score are equivalent.

**Proof.** By definition:

$$DSC = \frac{2|X \cap Y|}{|X| + |Y|}$$  \hfill (1)

where $| \cdot |$ indicates ‘the cardinality of’. Now, with reference to Fig. 1, we have:

$$DSC = \frac{2TP}{2TP + FN + TP}$$  \hfill (2)

On the other hand, again by definition, we have:

$$F_1 = 2 \frac{PR}{P + R}$$  \hfill (3)

where $P$ and $R$ respectively indicate precision and recall, i.e.:

$$P = \frac{TP}{TP + FP}$$  \hfill (4)

$$R = \frac{TP}{TP + FN}$$  \hfill (5)

From Eq. 4–5 we obtain:

$$P + R = \frac{TP (2TP + FP + FN)}{(TP + FN)(TP + FP)}$$  \hfill (6)

$$PR = \frac{TP^2}{(TP + FN)(TP + FP)}$$  \hfill (7)

Finally, substituting Eq. 6–7 into Eq. 3 we get:
\[ F_1 = \frac{2TP}{2TP + FP + FN} \] (8)