

# Turkish Journal of Mathematics


Turkish Journal

of

Mathematics

Modules Supplemented Relative to A Torsion Theory

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 [Keywords](#)  
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**Abstract:** This article introduces the concept of a  $\tau$ -supplemented module as follows: Given a hereditary torsion theory in  $\text{Mod } R$  with associated torsion functor  $\tau$ , we say that a module  $M$  is  $\tau$ -supplemented when for every submodule  $N$  of  $M$  there exists a direct summand  $K$  of  $M$  such that  $K \leq N$  and  $N/K$  is  $\tau$ -torsion module. We present here some fundamental properties of this class of modules and study the decompositions of  $\tau$ -supplemented modules under certain conditions on modules. The question of which direct sum of  $\tau$ -supplemented  $R$ -modules are  $\tau$ -supplemented is treated here.

**Key Words:** Torsion Theory, Supplemented Module

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Turk. J. Math., **28**, (2004), 177-184.

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Other articles published in the same issue: [Turk. J. Math., vol.28, iss.2.](#)