Frameworks for Product Family Design and Development

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In today's market, products must meet or exceed customers' needs while being competitively priced and developed in the shortest time possible. While product platforms address many of these requirements, they can incur additional development challenges with regards to coordination, time, and cost. Companies therefore need to use a concurrent engineering process to develop product families and product platforms efficiently; however, no concurrent engineering process models exist to support product family development. Based on concurrent engineering principles, four processes are proposed for systematic product family design using two platforming approaches — top-down and bottom-up — and two development drivers: product-driven and platform-driven. The first objective of this study is to propose a consistent product family development process terminology. The second objective is to detail representative frameworks and processes for the four proposed product family design processes based on the two approaches and two drivers. Several industry examples highlight the context and illustrate the four proposed processes.